

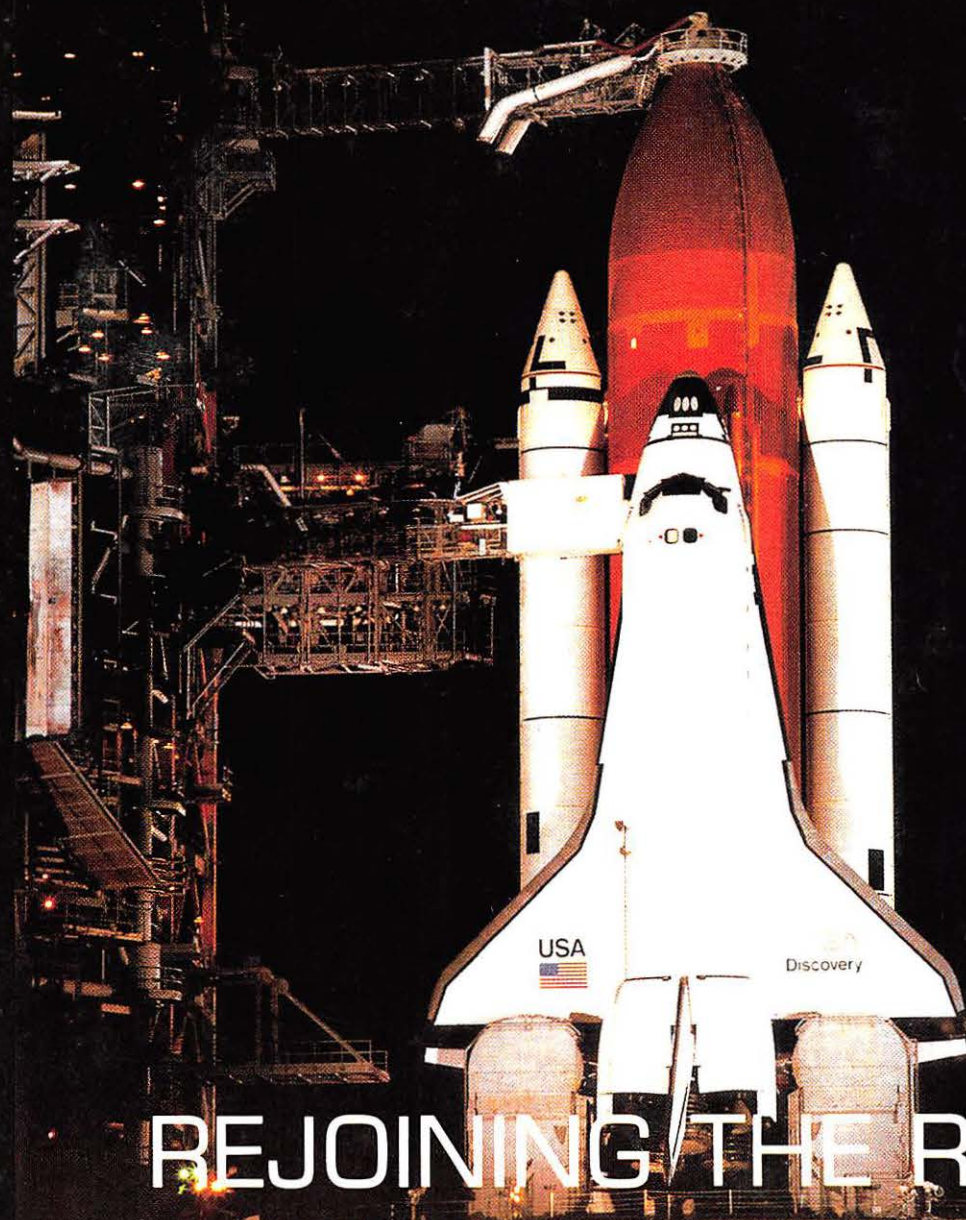
Second Class Postage Paid

Inside This Issue:

- Nicaraguan Radio Wars
- Trunk-Busting Basics
- Easy-to-build AM Radio
- *Kzapp!* Lightning and Your Radio

MONITORING TIMES

A Publication Of
Grove Enterprises



REJOINING THE RACE

From liftoff to touchdown, frequencies you can follow



ICOM HF Receivers



ICOM RECEIVERS

The World at Your Fingertips

Only ICOM brings the world into your living room...HF, VHF, UHF, and low band receptions. ICOM is the professional's choice to receive international broadcasts, aircraft, marine, business, emergency services, television, and government bands. Tune in with ICOM's IC-R7000 25-2000MHz* and IC-R71A 0.1-30MHz commercial quality scanning receivers for full spectrum coverage.

Incomparable Frequency Control.

Both the IC-R71A and IC-R7000 feature **direct frequency access** via their front keypad, main tuning dial, optional infrared remote control and/or computer interface adapter. **Flexibility of this nature can only be accomplished with an ICOM!**

Full Coverage, Maximum Performance. The superb IC-R71A is your front row seat to worldwide SSB, CW, RTTY, AM, and FM (optional) communications and foreign broadcasts in the 100kHz to 30MHz range. It features passband, IF Notch, low noise mixer circuits, and 100dB dynamic range. The pacesetter IC-R7000 receives today's hot areas of

interest, including aircraft, marine, public services, amateur, and satellite transmissions in the 25MHz to 2000MHz* range. It includes **all mode operation** low noise circuits plus outstanding sensitivity and selectivity. The combined IC-R71A/IC-R7000 pair creates a full radio window to the world!



The IC-R71A is a shortwave listener's delight. Its **32 tunable memories** store frequency and mode information, and they are single-button reprogrammable **independent of VFO A or VFO B's operations!** This HF reception is further enhanced by a dual width and level adjustable noise blanker, panel selectable RF preamp, selectable AGC, **four scan modes**, and all-mode squelch.

The IC-R7000 is a high band monitor's masterpiece. Its **99 tunable memories** are complemented by **six scanning modes**. It even scans a band and loads memories 80 to 99 with active frequencies without operator assistance! Additional features include selectable scan speed and pause delays, wide/narrow FM reception, and high frequency stability. Many professional services use IC-R7000's as calibration references.

Options. IC-R7000: RC-12 remote control, EX-310 voice synthesizer, CK-70 DC adapter, MB-12 mobile bracket. IC-R71A: RC-11 remote control, EX-310 voice synthesizer, FM module, CK-70 DC adapter, MB-12 mobile bracket, FL-32A 500Hz, FL-63A 250Hz, and FL-44A filters.

See the IC-R7000 and IC-R71A at your local authorized ICOM dealer.

* Specifications of IC-R7000 guaranteed from 25-1000MHz and 1260-1300MHz. No coverage from 1000-1025MHz

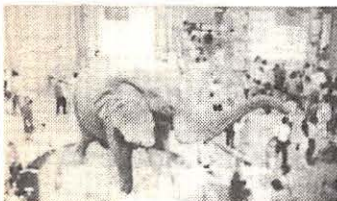
 **ICOM**
First in Communications

ICOM America, Inc., 2380-116th Ave. N.E., Bellevue, WA 98004 **Customer Service Hotline (206) 454-7619**
3150 Premier Drive, Suite 126, Irving, TX 75063 / 1777 Phoenix Parkway, Suite 201, Atlanta, GA 30349
ICOM CANADA, A Division of ICOM America, Inc., 3071 - #5 Road Unit 9, Richmond, B.C. V6X 2T4 Canada

All stated specifications are approximate and subject to change without notice or obligation. All ICOM radios significantly exceed FCC regulations limiting spurious emissions. RCVR587.



MONITORING TIMES



Confused over how to monitor a trunked system? We'll turn you into a "trunk buster" - p.10

"We Have Liftoff" by Larry Van Horn

6

Space. The final frontier. America is once again ready to challenge it. And MT readers are ready to monitor it with the most exhaustive list of frequencies ever published.

Trunk Busting Basics by Bob Kay

10

Is the new trunked system technology frustrating your scanning? Bob Kay says all is not lost. MT's resident scanning expert has the answers.

Radio War in Nicaragua by Wood and Pedersen

12

War is fought on many fronts and radio is one of them. Join Radio Sweden's George Wood for a first-hand look at the radio wars of Central America's Sandinista hotspot.

Lightning! by Bob Kay

18

Kzzzap! Lightning. It's the radio hobbyists biggest enemy. And it's not just a mid-summer phenomenon. MT checks with the experts on nature's power-packed light show.

Back to School by Myles Mustoe

22

These elementary students are fortunate to have a teacher who knows the worlds of fun and (sh-h-h) education that may be opened through shortwave radio.



Radios in the classroom?! A new way to broaden one's education - p.22

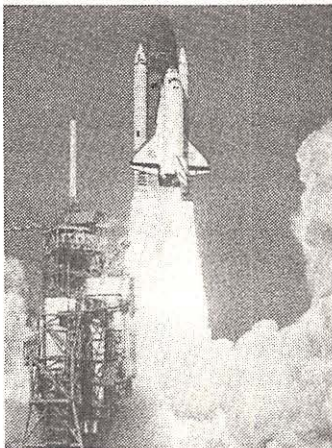
Looking for a bargain radio? An "old faithful" might be had for a song - p.88

Build a working AM radio without being an electronic wiz to do it - p.92

Crazy Uncle Skip. He thinks that you should be able to enjoy your hobby without spending a lot of dollars - p.38

DEPARTMENTS

Letters	3	Below 500 kHz	54
Communications	4	Consumer Electronics	56
Shortwave Broadcasting	24	Program Review	58
Utility World	28	Program Guide	59
Scanning the Nation	32	Frequency Section	65
What's New?	36	Magne Tests ...	88
Uncle Skip's Corner	38	Scanner Equipment	90
The Federal File	40	DeMaw's Workbench	92
High Seas	42	Experimenter's Workshop	94
On the Ham Bands	44	Antenna Topics	96
The QSL Report	46	"Ask Bob"	98
Reading RTTY	47	Stock Exchange	102
Satellite TV	48	Convention Calendar	103
Domestic Broadcasting	50	Closing Comments	104
Outer Limits	52		



Inside this Issue • The problems plaguing America's re-entry into space have undoubtedly caused headaches down at the Kennedy Space Center. Every time a date for the launch of the shuttle is announced, it seems to be postponed. It's been going on for what seems like months. *Monitoring Times'* super-popular utility expert, Larry Van Horn has been sharing those headaches. • You see, even though final preparation of *MT* is completed only three weeks before you receive it, everytime the launch has been re-scheduled, we've had to re-schedule his article on monitoring the space shuttle. • This month, however, we said to heck with it. Let the presses roll! So whether the USA's space-phoenix rises from the ashes of the ill-fated Challenger at the end of

this month or later in the fall, you'll have all of the frequencies -- whether you're a scanner enthusiast living near the Cape in Florida or a shortwave listener on the west coast -- you need to tune in the action.

• From the final frontier to a destination closer to home, Swedish journalist and DX show host **George Wood** (right) travels to Nicaragua to present an unsettling look at broadcasting in that war-torn country. As George says, there's a war going on down there and it's not all being fought with guns. Powerful radio stations ply their political wares even when the shooting stops. You may not agree with George's views but we're certain that you'll find it one of the best pieces of writing we've ever had the opportunity to present to you.



• Back home, a lot of local police and fire services are switching over to something called "Trunked Systems." And it seems to make monitoring impossible. Did someone say impossible? Not *MT's* **Bob Kay**. A former Marine, Kay is not easily frustrated and in this month's issue, he not only explains the system but tells you how to overcome its effects. Kay also checks in with an article on the radio listener's nemesis, lightning, as well as his regular column on scanning. Perhaps we should rename the magazine, *Bob Kay Times* this issue.

• A couple of magazines out there claim to offer "useful, easy-to-build" radio projects. When you look inside, you find that it's something like "Build a 29-30 MHz Receiver Out of a Lawn Mower" -- and that you need a Ph.D in Electrical Engineering before you can even get started. This month, *Monitoring Times* offers two projects that you can build even if you don't know what end of a soldering iron to hold. (Tip: It's the end that stays cold.) • In **Clem Small's** monthly "Antenna Topics" column, Vermonter Small gives you step-by-step instructions on how to construct a simple, low-cost antenna that will work for you. • **Doug DeMaw** really begins to get his new column under way with another project -- a simple crystal radio set. Who says that you have to spend big bucks to go DXing? Not Doug or Clem!

• As if that wasn't enough, *Monitoring Times* offers the entire compliment of regulars -- from Larry Magne's receiver review to Kannon Shanmugam's witty program previews. It's 104 information packed pages again in September!

Stay tuned • Next month in a rare turn of events, John Combs shows you how you can get the dirt on your local broadcast stations, unedited and completely in the raw. There's at least a page of great frequencies for you to try. There's also a primer on DXing those abundant yet always elusive Indonesian shortwave stations and another of Wayne Mischler's great radio stories. It's all coming up in the next issue of the world's favorite communications magazine, *Monitoring Times*. Be there or be square!

MONITORING TIMES

Published by

Grove Enterprises

Publisher

Bob Grove, WA4PYQ

Managing Editor

Larry Miller

Technical Editor

Ike Kerschner

Frequency Manager

Greg Jordan

Design and Production

Rachel Baughn

Subscriber Services

Linda Newton

Advertising and

Dealerships

Judy Grove

Contributing Editors

Reading RTTY

Jack Albert

Uncle Skip's Corner

T.J. Arey, WB2GHA

Plane Talk

Jean Baker

DeMaw's Workbench

Doug DeMaw

Shortwave Broadcasting

Glenn Hauser

High Seas

James R. Hay

Federal File

Dave Jones

Scanning Report

Bob Kay

On the Ham Bands

Ike Kerschner, N3IK

Magne Tests...

Lawrence Magne

Adventures in the Clarke Belt

Ken Reitz

Outer Limits

Dr. John Santosuosso

Program Review

Program Guide

Kannon Shanmugam

Antenna Topics

W. Clem Small, KR6A, CET

Domestic Broadcasting

Paul Swearingen

Shortwave Broadcast Loggings

QSL Corner

Gayle Van Horn

Utility World

Larry Van Horn

Scanner Equipment

Larry Wiland

LETTERS



Embassy "All Ears"

Regarding how Senator Moynihan's allegations on how the Soviets are monitoring Ma Bell's air waves and other radio signals -- we all know that it's true. What we don't talk about is that we Americans do the same thing at our embassies and missions around the world.

I went for several months to the Philippines and as a radio buff I could not believe my eyes at all of the dipoles and other small antennas plus one big microwave tower on the top and in the back of the U.S. embassy in Manila overlooking Manila Bay.

When I began to take photos a car came out of the embassy's front gate and stopped. Two big men came rushing out of the car and quickly walked toward me and asked what I was doing. I showed them my ID card and told them I was a reporter taking file photos of our embassy.

I then looked at their ID cards and they were from the NSA. We know what that is, don't we?

Then I went to do some sight-seeing north of Manila to a part called "Baguio" that's about 5,000 feet above sea level, where I saw the VOA Philippine relay station on one mountain. On another mountain was a large U.S. Navy or Air Force

On Summertime Listening

You are right. I'm wrong, I admit it. I cut way back on my shortwave listening this summer. Why? Because I kind of assumed that there was nothing to hear. Your article in the July issue [Summer Listening... Summer Not] turned my head around. Shortwave does not die because of high temperatures. It is compatible with outdoor living. Thanks to *Monitoring Times*, I've become a full-time shortwave listener -- not just another foul-weather friend.

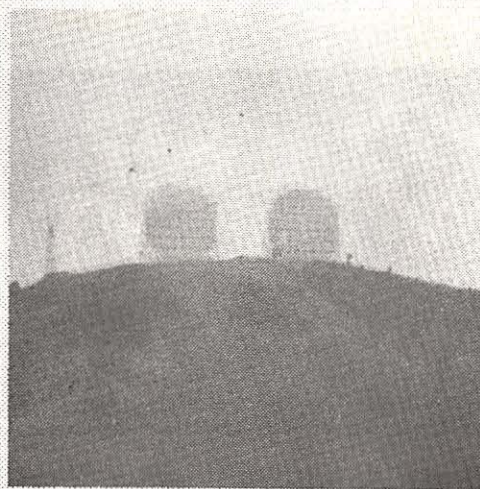
Amos Courtland
Georgetown, Kentucky

When I first saw your article "Summer Listening...Summer Not," I thought that aside from a cute title, it had little to offer me. I was surprised to find that it was more than hype. The frequency tips were good (even if they were primarily designed for east coast listeners) and there are things to hear!

Ken Mytle
Portland, Oregon

You're right. There are things to hear on shortwave during the summer: every lightning storm between your receiver and a transmitter.

Martin Bryson
Ft. Lauderdale, Florida



U.S. Air Force radar amidst the clouds

communications station.

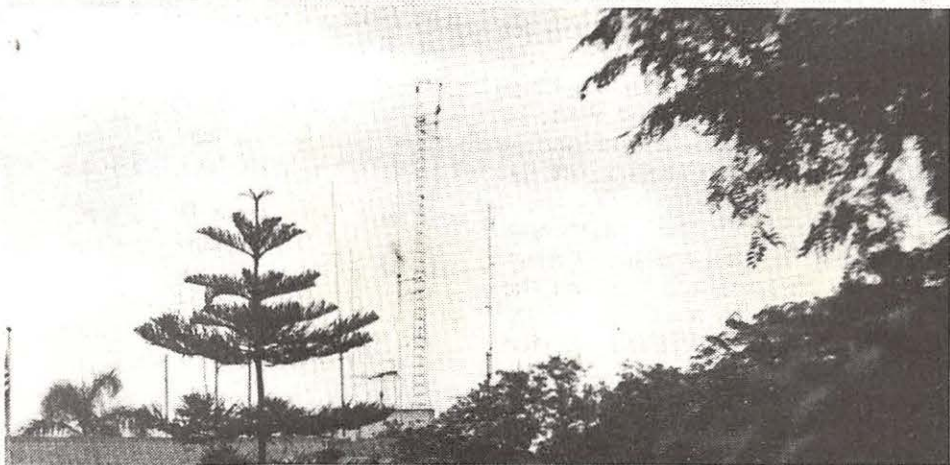
The antennas looked like two large, flat solar panels. People who live in the area tell me that it's used to detect low-flying aircraft. So I went as close as I could get and turned on my shortwave radio. All I heard was a loud woodpecker which confirms the report that they gave.

My point is we are always talking about what the Soviets are doing without looking at ourselves.

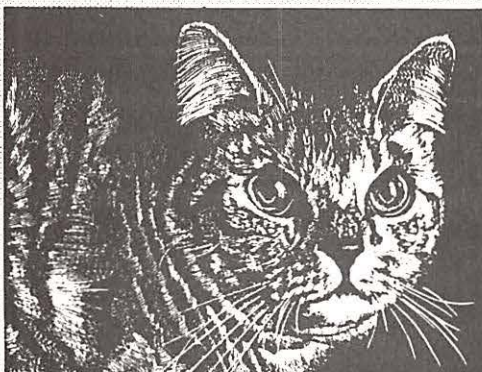
P.S.: The frequency for the Philippine National Police is 150.36. They are called CAPCOM. And the HQ is called Thunder Base.

David M. Torres
New York, NY

[More "Letters" on page 100]



I was almost stopped for taking this photo of the mass of antennas on top of the U.S. embassy in the Philippines



Reason to worry

Here, Kitty, Kitty, Kitty

Ken Watson didn't like what he was hearing on KITY, Power 93-FM. Of that, the 29 year old Bulverde, Texas, man was certain. Intent on symbolically making his point to the station, Watson reportedly killed and cut up five cats. Each of the dismembered kitties was then placed in a separate box and set at the front door of the station.

Later arrested and charged with cruelty to animals, the suspect explained himself by saying that he had talked it over with God and that the cats were sick anyway. Said one station official: "It was very upsetting."

No Protest Here

Air Force Capt. Robert F. Weiland probably didn't have protest on his mind when he piloted his F-16 jet fighter across rural Robeson County, North Carolina, last month. Nonetheless, he ended up knocking WSTS, a 80,000 watt Christian station in Laurinburg, North Carolina, off the air.

According to Dave McMahon, deputy chief of public affairs at Shaw Air Force Base in South Carolina, the multi-billion dollar plane hit WSTS' transmitter after Weiland ejected from the jet. There was no comment from station management; however, the Air Force issued a statement saying it is "always concerned" when a plane crashes. Weiland's F-16 was the

second based at Shaw to crash in two weeks.

Help Save AFRTS

Several years ago, someone from Radio Canada International called us. What he said shocked us: RCI was to close down its North America service. "If you could get your readers to write enough letters, maybe we could save it," he said.

So many letters were received from our readers that the station's management -- after privately expressing surprise at your response -- went on the air, saying that *it was all a big mistake and that they never really intended to close the service to the U.S.!*

Well, we've done it once. Let's do it again. But hurry. There isn't much time. Armed Forces Radio and TV Service [AFRTS] is scheduled to leave the air at the end of this month.

Write a strong (do not kill any cats) but thoughtful letter on why you want AFRTS to remain on shortwave and make three copies. Send them to:

Charles Z. Wick, Dir.
U.S. Information Agency
301 Fourth Street S.W.
Washington, DC 20546

Lt. Col. Thomas Hansen
AFIS/AFRTS
601 N. Fairfax, Suite 360
Alexandria, VA 22314

The Hon. Clairborn Pell, Chairman
Senate Foreign Relations
Committee
Room SR-335
U.S. Senate
Washington, DC 20510

The Hon. Dante B. Fascell,
Chairman
House Foreign Affairs Committee
Room 2354
U.S. House of Representatives
Washington, D.C. 20515

All it takes to cast your vote in favor of AFRTS on shortwave is four 25 cent stamps and your time. Isn't it

worth a dollar to have an all news and sports station on shortwave? *You bet.* We sincerely urge you to take a moment of your time to write.



Volunteers, anyone?

Uncle Sam Wants You

Interested in giving Uncle Sam a hand by doing a little monitoring? Well, Captain A.L. Tucker, Program Manager of Special Projects at the Navy's Space and Naval Warfare Systems Command in Washington, DC, is testing out a new type of low frequency antenna. As part of the testing, he'd like to receive reception reports from *Monitoring Times* readers.

Testing of the antenna will run sporadically through October from sites at Bumpass, Virginia and Carroll Island, Maryland. Transmitter output power is 1 kilowatt and the primary operating frequency will be 185 kHz with 175 standing by for secondary usage.

The signal will consist of alternate periods of steady carrier and on-off keyed ten word per minute international Morse Code with the call sign NWA, the word "TEST" and a single alphabetic character related to the current test condition.

In order to qualify for a special, once-in-a-lifetime QSL card, you must identify the time and date, the location of your receiver, a description of the antenna and receiver, the frequency of the signal received, its

quality and the test condition alphabetic character.

Current information on test times and frequencies will be provided on a prerecorded message at area code 703-471-1539.

Send your reports to SPAWAR, NWA Test, Washington, D.C., 20363-5100. Be sure to mention that you read about it in *Monitoring Times*.

Is the PM a Radio Buff?

Indian Prime Minister Rajiv Gandhi is a DXer. According to *Gentleman* magazine, the PM can often be found behind the dials of his shortwave radio, trying to hear news broadcasts from "important stations" around the world. *Gentleman* says that Gandhi's shortwave listening habit began when combined two of his other past times: running India and being an avid ham operator.

Any truth to the rumor that the PM is also an *MT* subscriber?

Radio Phony

A man convicted of faking a plane crash and then telling searchers that his three passengers were dead and he was bleeding to death, was sentenced to a year in prison and ordered to undergo psychiatric evaluation. The resulting search, utilizing as many as 100 people, 20 aircraft and six police agencies, reportedly cost some \$50,000.

At Blair's trial, David Webster, a Navy reservist and Delta Airlines pilot, said his crew tracked the voice of a man who talked sporadically and said he was chilled, weak and losing blood. "The people in my plane were screaming and yelling," said Webster. "I got tears in my eyes thinking, 'We're going to get this guy out.'"

U.S. Circuit Judge Hugh Bownes said in sentencing Blair that "It seems obvious to me ... that there is some kind of mental aberration involved for a normal person to set this kind of event in action."



It never happened

No More Radio or TV Stations?

Saying that "Broadcasters are not afraid of competition," the NAB (National Association of Broadcasters) has issued a position paper encouraging restraint in creating new radio and television stations. According to joint board Chairman Wallace Jorgenson, the paper "is not an attack on new technologies; it is not an effort to ask policymakers for a complete halt to any new allocations."

Instead, it is an effort to get policy makers to look at the economic and technical harm which could accrue in an overly congested marketplace. "[We] are afraid of a marketplace so congested with stations that, for technical and economic reasons, no one can compete effectively."

Government "Shares" HF Spectrum Usage

A new program mandated by the White House and implemented by the National Communications System (NCS) is intended to integrate the intercommunications ability of all federal agencies. The preliminary

manual of participating agencies, personnel and networks is about the size of the Manhattan telephone directory.

The integrated network, code-named "SHARES", will allow virtually every radio-licensed government agency -- FBI, Army Corps of Engineers, FEMA, State Department, Department of Interior, U.S. Navy, Postal Service -- to interface during an emergency. They will also be heard utilizing routine communications to keep the system up.

As a case in point: suppose a Justice Department bureau learns of an impending bank robbery in a remote town across the country. Normal communications are disrupted or otherwise impractical. The Justice official picks up his directory and routes his call through an FAA radio link, thus accessing his remote compatriot.

Eventually, the high-tech system will employ propagation sampling, constantly testing upper and lower frequency limits, selecting optimum links on a continual basis.

The traditional shortwave spectrum, 2-30 MHz, is being "rediscovered" by massive communications organizations. Operation SECURE was organized to provide interstate communications in time of emergency and even the U.S. Postal Service is implementing HF for mobile tracking of suspected mail fraud and other postal infringements.

Rather than falling into disuse, abandoned for satellites, it would appear that shortwave communications are here to stay. Less vulnerable than satellites and less likely to be blacked out by nuclear conflagration, the high frequency spectrum shows great promise, even for emerging technologies. Expect increasing use in the foreseeable future.

Credits: Associated Press via Dave Alpert, NY, *Gentleman Magazine*, *Radio World*.

On p.4, August issue, VOA was incorrectly substituted for AFRTS in the photo caption.

"WE HAVE LIFTOFF"

Monitor the Shuttle's leap back into space

by Larry Van Horn

It appears, illuminated by giant one million candlepower arc lamps. The first thing you notice as it begins to leave the vehicle assembly building is the big orange tank in the middle. Flanked on either side of the orange external tank are the gleaming white solid rocket boosters. The mind returns, briefly, to a cold day in January 1986 when one of these rockets caused a tragedy we will remember forever.

Finally, after what seems like an eternity it inches into view. A magnificent black and white winged vehicle named Discovery, destined to carry five astronauts into space sometime this fall.

Discovery and its associated hardware took nearly eight hours to make the Fourth of July, 4.2 mile trip to shuttle launch pad 39B this summer. No matter the speed, the rollout of STS-26 represented a milestone on NASA's road to recovery.

The mission will be commanded by Frederick H. Hauck (Captain, USN). Hauck previously commanded mission 51-A in November 1984 and served as pilot on STS-7 in June 1983. Richard O. Covey (Lt. Col., USAF) will be the pilot on this mission. Covey served as pilot on flight 51-I in August 1985.

Mission specialists for STS-26 will be John M. Lounge, who flew as a mission specialist on flight 51-I; George D. Nelson, who served as a mission specialist on flights 41-C in April 1984 and 61-C in January 1986; and David C. Hilmers (Major, USMC), who flew as a mission specialist on flight 51-J in October 1985.

A tracking and data relay satellite (TDRS) will constitute the primary payload for this mission. An identical satellite was destroyed in the Challenger accident over 2-1/2 years ago. The TDRS is used to relay communications from the shuttle spacecraft and earth based orbiting satellites.

Additional cargo to be flown on Discovery's middeck area include five microgravity experiments, life sciences, atmospheric science and infrared communications experiments as well as two student experiments.



The space shuttle begins its slow trek to the launch pad

Monitoring NASA on HF

Table 1 reflects current NASA/USAF HF networks in use. Listeners must keep in mind that HF frequencies are primarily backup circuits to VHF/UHF terrestrial networks and satellite links; therefore, don't expect a lot of activity on these channels.

Most space launches from the Cape utilize military units and communications to support launches. Three main branches of the military -- the Air Force, Navy and Coast Guard -- are involved with most space launches.

In most cases, countdowns for space launches start about 48 hours prior to liftoff. Usually at this time the mission director will call up all stations involved with the launch and test all communication circuits. This is usually a good

time to get a handle on what frequencies to start monitoring. Monitors must keep in mind that frequency circuits in use will depend on propagation from the Cape to stations in the network, not to the listener's location.

During past missions, the MUX channel on 20192 kHz has carried shuttle mission audio. Check around 20198 kHz in lower sideband. This appears to be coming from either Ascension Island or Patrick AFB, Florida.

The primary radio site for NASA communications is located at Malabar, Florida. This site is maintained and leased from RCA communications. There are 20 transmitters located at this site that can be used for NASA mission support.

The Navy also has a transmitter at Malabar



The crew of mission STS-25 shuttle Discovery

with 20 preset channels (see Table 2). Normally operators will establish contact with Navy units involved with the launch via this transmitter and direct them to channels in use from Table 1.

The Coast Guard plays a very large role in any NASA launch. It is the responsibility of Coast Guard units to keep the restricted area off shore from the Cape clear of marine traffic. Table 3 lists the most commonly heard Coast Guard channels on HF used during launches from the Cape.

There are several backup channels that are not in current use. Most government agencies have a hard time getting new frequency allocations from the government's FCC, IRAC (Interagency Radio Advisory Committee). Consequently, agencies are very reluctant to turn in a channel even if they currently aren't using it. Table 4 is a complete list of assigned but dormant NASA/USAF allocations that could be used during future missions.

Ham Frequencies Carry Mission Audio

An added bonus in monitoring shuttle missions is received courtesy of amateur radio operators. Shuttle mission audio can be heard on shortwave radio frequencies. Amateur radio club WA3NAN at the Goddard Space Flight Center has provided this service in the past and indications are that this will continue. Frequencies to watch include: 3860, 7185, 14295, 21390, 28650 kHz and on VHF in the Greenbelt, Maryland, area 145.550 and 147.450 MHz.

In the past, the Johnson Space Center's club W5RRR has carried shuttle audio. Frequencies to watch include: 3940, 7265, 14280, 21365, and 28600 kHz.

Those individuals who go down to the Cape should monitor the 146.820 repeater in Gainesville, Florida. The Gainesville Amateur Radio Club has provided this service during past missions. They relay the audio from the Merritt Island repeater mentioned previously.

Monitors in the Los Angeles area should check 224.04 for mission audio from the Jet Propulsion Lab in Pasadena. Several repeaters in southern California pick up the service and retransmit portions or all that is available during each shuttle mission. Repeaters to check include: 145.6, 145.46, 146.75, on UHF 446.775 and 447.775.

Listeners in other areas of the country not covered above might want to check with local radio amateurs on the availability of shuttle mission audio in their areas. One interesting note -- some hams are even sending shuttle video via amateur fast scan TV. Those of you so equipped might want to check out this possibility with your local amateur TV club or group.

NASA on VHF/UHF

Table 5 reflects VHF/UHF assignments, and usage where known of NASA/USAF sites associated with space shuttle missions. Listeners must keep in mind that these frequencies are line of sight, therefore you

TABLE ONE NASA Malabar (Palm Bay) HF Networks

2405	Data buoys
2622	SRB recovery primary
2664	Backup mission audio-Cape to Houston
2678	ETR range control
2716	Navy harbor cntl-Port Canaveral
2764	SRB recovery channel
3024	Coast Guard SAR-primary
3187	SRB recovery ships channel
4376	Primary recovery zone SAR
4510	SRB recovery ships channel
4856	Cape radio/leader
4992	Cape radio/coast guard ships
5180	NASA tracking ships
5187	NASA tracking ships
5190	ETR primary night channel
5350	Launch support aircraft
5680	Launch support ships
5810	ETR-secondary night channel
6720	SAR primary Atlantic
6896	Cape radio
6837	Cape radio
7412	SAR comms with Bahamas
7461	Cape radio/launch support A/C
7525	NASA ground tracking net
7676	Launch support aircraft
7765	SRB recovery ships
7919	Data channel
7985	Data channel
9022	Launch support aircraft
9043	Launch support aircraft
9132	Launch support aircraft
10305	Space missile tactical net
10310	Malabar to Ascension Is-MUX
10780	ETR-primary day channel
11104	Launch support ships
11252	Launch support ships
11407	SRB recovery ships
11414	Cape radio
11548	Cape radio
11621	SRB recovery ships
13227	Launch support aircraft
13237	Data channel
13495	Data channel
13600	Malabar to Ascension Is-MUX
13878	Launch support aircraft
14937	Ascension Is to Malabar-MUX
18009	Launch support ships
19303	Launch support ships
19640	Cape radio
19966	Ascension Is to Malabar-MUX
20186	Launch tracking net
20192	Malabar to Ascension Is-MUX
20198	OCC shuttle mission audio
20390	ETR-secondary day channel
22755	Ascension Is to Malabar-MUX
23413	Cape radio
27065	NASA CB radios

must be fairly close to the transmitter sites to hear these frequencies.

Listeners in the Houston area can hear shuttle audio courtesy of JSC's 171.150 channel during missions. It is my understanding that this service is provided for journalists following shuttle missions at the Johnson Space Center.

The frequencies provided in Table 6 are the primary frequencies that should be monitored at the Cape during any shuttle launch. Any additions and corrections to these lists are

most welcome and can be sent to *MT* headquarters in Brasstown. Please mark your envelopes "Attention Project NASA."

Other Shuttle Comm Opportunities

During most shuttle missions AT&T offers a call in number so people can hear real-time shuttle communications. Charge for the call anywhere in the contiguous U.S. is \$.50 for the first minute and \$.35 for each additional minute. *MT* readers might wish to check with your local Ma Bell operators for the 1-900 telephone number currently in use.

Satellite dish owners also have reception opportunities. NASA provides the NASA Select channel on a C-band satellite. This channel provides video and audio to other NASA sites and contractors, providing not only lift-off to landing coverage but "change of shift" briefings as well.

Shuttle missions aren't the only thing carried on NASA Select. Voyager flybys of Jupiter, Saturn, and Uranus; unmanned launches; Challenger disaster hearings are just some of the more interesting happenings on this channel. NASA Select is currently being viewed on SATCOM F2 transponder 13.

TVRO dish owners should also check network and NASA backhaul channels and AFRTS satellite channels for shuttle video and audio.

Informed sources at the Cape indicate that NASA plans on using military communication satellites during shuttle missions. *MT* readers equipped to monitor FLEETSATCOM and LEASAT channels should check out satellites serving the continental U.S. for possible shuttle launch associated traffic and mission audio.

Shortwave broadcast listeners will be pleased to know that the Voice of America will carry extensive coverage of the launch. According to Richard Firestone of the VOA's special events office, coverage of the launch and landing of Discovery will be carried by at least ten different language services. In addition, regular updates on the mission will be provided on VOA newscasts. This should afford listeners overseas a chance to follow the launch and landing of mission 26. You might also want to listen to other major broadcasters for in-depth coverage of the STS-26 mission.

The Ultimate Comms

The ultimate in shuttle monitoring is to hear the orbiter communications direct. This is probably easier than you expect, but it does take patience.

The shuttle transmits in the military UHF

range on three different frequencies. 296.8 is the primary shuttle downlink channel. This is a simplex frequency and only one side will be heard (from the crew cabin). 259.7 is also available aboard the shuttle on a secondary basis. 279.0 is probably the most exotic of the three channels. It is used as a link from the astronauts space suits to the orbiter during space walks or EVAs. Good luck on hearing this simplex frequency.

The orbiter does carry the International Military Distress channel of 243.0 MHz; however, this is only used as an emergency backup. These UHF channels are only backups to the primary shuttle frequencies located in the S-band. Below is a summary of shuttle orbiter channels located in the S-band region:

Orbiter FM downlinks:
2250.0 (FM OI), 2205.0 (FM DFI)
Orbiter PM downlinks:
2287.5 (Primary), 2217.5 (Secondary)

DOD USAF PM uplinks:

1775.7 (Secondary), 1831.8 (Primary)
NASA PN uplinks:
2041.9 (Secondary), 2106.4 (Primary)

Mission STS-26 will be by and far the most extensively covered shuttle mission since the first launch of Columbia in April 1981. *MT* readers will have many chances via radio to hear and monitor the launch, mission and landing of the crew aboard the shuttle Discovery. Be sure to tune in and listen to the excitement as NASA announces: "We have liftoff."

Over the last couple of years, many MT readers have supported our project NASA effort. We thank them. The result is the collection of frequencies printed here, the most comprehensive list of NASA communications ever published outside of the government.

TABLE 2
US Navy Malabar
Transmitter Presets

3130	FACSFAC Jacksonville
5718	Allantic fleet ship
6693	Allantic (ATL) fleet aircraft
6708	ATL fleet ships/aircraft
6723	Navy ATCOM channel
8779	ATL fleet ships
8972	ATL fleet safety of flight ch
8981	Navy P-3 A/C to NASA ch
9006	ATL fleet A/C duplex w/11205
11205	ATL fleet A/C duplex w/9007
13172	ATL fleet ships/aircraft
15021	ATL fleet ships
15051	ATL fleet ships
15057	ATL fleet ships
15067	ATL fleet ships tactical
16167	Navy fixed net channel
16419	Navy fixed net channel
18019	ATL fleet aircraft
22687	ATL fleet ships
23224	ATL fleet aircraft

Also 6742 and 11252 can be substituted for 3130

TABLE 3
NASA Associated
Coast Guard Channels

2103	Intra-Coast Guard usage
2182	International distress channel
2261	Air-to-ground channel
2638	Non-sked urgent and safety B/C
2667	Intra-coast guard usage
2670	Sked and non-sked marine info
2691	7th CG district operations
2738	Ship-shore and ship-ship
2830	Ship-shore and ship-ship
3023	Intl SAR channel
3123	Air-to-ground (USN shares channel)
4376	CG SAR channel during STS-51L
5680	Intl SAR channel
5692	Air-to-ground Helo (USN shares)
5696	Air-to-ground, PRI (USN shares)
8984	Air-to-ground, PRI (USN shares)

TABLE 4
NASA Reserved Frequencies

2505	2744	2800	2836	3120	3365	4500	4704	4714
4755	4825	4860	4900	5060	5235	5246	5436	5775
5822	6750	6753	6810	6880	6919	7313		7605
7697	7742	7804	7833	7860	7910	8077	8993	9018
9115	9138	9170	9910	10159	10215	10230	10270	10301
10327	10475	10850	10880	10905	10949	11634	11984	11988
12107	12160	12277	12876	12287	13210	13244	13380	13468
13676	13735	13742	14497	14585	14615	14650	14896	14967
15698	16216	16246	17470	17490	17554	17668		
18022	18051	18196	18310	18331	18354	18434	18700	18769
18801	18990	19126	19143	19371	19390	19928	19963	20266
20272	20475	20690	21810	22683	22990	23035	23281	23325
23479	23485	23661	23840	23940	24240	24512	24530	24780
24914	25130	25161	25198	25245	25597	26356	26389	26515
26684	27720							

TABLE 5 FREQUENCY PLANS NASA SUPPORT SITES

All frequencies in MHz.

GODDARD SPACE FLIGHT CENTER - GREENBELT, MD

164.175 167.825 167.925 170.025 170.350
170.400 171.000 171.150 173.660 173.685
408.150 412.000 167.925 (FEMA)

JOHNSON SPACE FLIGHT CENTER - HOUSTON, TX

164.200 164.985 168.450 169.000 170.100
173.685 314.600 382.600
168.000 (maintenance)
164.050 (FAA)
171.150 Shuttle mission audio from JSC.

MARSHALL SPACE CENTER - HUNTSVILLE, AL

122.850 162.125 164.175 164.200 164.175
164.975 165.325 166.225 167.875 168.450
170.100 170.200 170.350 170.400 171.000
171.150 172.225 173.025 173.610 173.660
173.685 173.785 314.600 382.600

DRYDEN RESEARCH CENTER - EDWARDS AFB, CA

49.830 122.850 162.025 162.610 164.100
165.610 166.225 168.000 169.400 170.350
170.400 171.000 171.150 240.200 240.600
241.400 241.600 241.800 259.700 278.900
296.800 314.600 371.700 382.600 384.800
38.650¹ 138.050 138.075 138.175 138.250
138.400 139.800 141.550 148.050 148.550
148.675 148.900 149.150 149.225 150.150
150.280 155.280² 173.435 228.200 229.600
235.000 236.000 239.400 245.300 248.600
251.900 257.000 260.700 262.500 264.600
266.300 267.900 268.100 272.000 274.200
278.900 279.900 280.100 284.100 286.400
286.800 287.200 289.100 290.600 291.800
294.600 297.400 304.000 308.700 311.000
311.200 311.400 314.400 315.200 315.900
319.600 322.700 325.900 337.000 341.600
349.300 349.600 351.400 358.400 359.200
378.100 379.700 383.000 384.800³ 385.900
395.100 398.100 413.450 235.000³

¹ AF ² NASA ³ USN

121.800 Lakebed traffic control
162.625 Purge VHF network
168.000 Cooling VHF network
169.600 TV direction (JSC)
372.200 Pilot-to-dispatcher
120.700 Edwards VHF tower
318.100 Edwards UHF tower
390.100 Edwards UHF ground control
375.200 PMSV: Metro weather
339.900 Army aviation
38.450 Air-to-ground VHF command
164.100 Convoy command VHF network
169.400 PAO release (JSC)
269.900 Edwards ATIS
236.600 Edwards UHF tower
121.800 Edwards VHF ground control
304.000 Edwards command post (Conform)
141.100 Army aviation

KENNEDY SPACE CENTER, FL

Freq	User	Usage
138.450	AF	AM mode channel (shared with CCAFS)
148.455	AF	NASA NET 112 - SRB recovery ops/crawler transportation ops
149.175	AF	NASA NET 113 - SRB recovery ops/crawler transportation ops
162.0125	AF	NASA NET 306 - Marine operations (barge supply)
162.6125	AF	NASA NET 104 - Launch support ops "Alpha control"
163.5375	AF	NASA NET 108 - PAO (Paging)/hurricane operations
164.650	I	Wilson KID717 to KNDYSPCN KID

728	I	Turtland KID768 to KNDYSPCN KID 728
728	I	NSMYRNBC KID767 to KNDYSPCN KID 738
164.750	AF	National Park Service (KSC) KID 728
165.0125	AF	Wilson KID717
165.1875	AF	NASA NET ??? - Environmental Monitoring (Paging)
165.4125	AF	NASA NET 102 - Telemetrics/MEAS
165.6125	AF	NASA NET 110 - Orbiter operations
167.850	DOE	NASA NET 202 - Telemetrics/MSBLS
167.850	DOE	Department of Energy (nuc weapons)
168.450	DOE	Department of Energy (nuc weapons)
170.150	AF	NASA NET 107 - Base comms
170.175	AF	NASA NET 206 - GSA Operation/truck and rail support
170.350	AF	NASA NET 308 - Base paging
170.400	AF	NASA NET 106 - GSA supply
171.000	AF	NASA NET 101 - Base utilities
171.150	AF	NASA NET 201 - General maintenance fuels "NOVA"
173.175	AF	NASA NET 203 - Security, tactical 2
171.2625	AF	NASA NET 408 - PAO TV-coordination
173.4375	AF	NASA NET 117 - Hospital-CD net
173.5375	AF	NASA NET 111 - Loan pool
173.5625	AF	NASA NET 116 - Fire and rescue, channel 1
173.6625	AF	NASA NET 105 - Primary pad ops
173.6875	AF	NASA NET 103 - Security prin, channel 2
173.7875	AF	NASA NET 216 - Fire and rescue, tactical channel 2
407.325	AF	NASA UHF 1 - Convoy command Launch complex (LC) 39 ops pool
407.475	AF	NASA UHF 2 - VAB Crand operations LC 39 operations pool
408.150	AF	NASA UHF 3 - Convoy purge control LC 39 operations pool
408.175	AF	NASA UHF 4 - VAB Crane operations LC 39 operations pool
408.800	AF	NASA UHF 5 - LC 39 operations pool
409.050	AF	NASA UHF 6 - VAB Crane operations LC 39 operations pool
409.125	AF	NASA UHF 7 - LC 39 operations pool
409.175	AF	NASA UHF 8 - Convoy cooling control LC 39 operations pool
412.825	AF	UHF 1 - Industrial area pool (O&C)
412.950	AF	UHF 2 - Mobile cranes/rigs
413.025	AF	UHF 3 - Industrial area pool (O&C)
413.075	AF	CC501 Convoy cargo ops
413.125	AF	
413.150	AF	UHF 4 - Industrial area pool (O&C)
413.250	AF	UHF 5 - Industrial area pool (O&C)
413.325	AF	
413.375	AF	UHF 6 - Industrial area pool (O&C)
413.525	AF	UHF 7 - Industrial area pool (O&C)
413.550	AF	UHF 8 - Industrial area pool (O&C)
916.000	AF	NASA crawler moves
929.000	AF	NASA crawler moves
939.000	AF	NASA crawler moves

SHUTTLE LANDING FACILITY

123.600 Common traffic advisory frequency
126.300 VHF SLF tower
284.000 UHF SLF tower
121.750 VHF SLF ground control

CAPE CANAVERAL AFS, FL

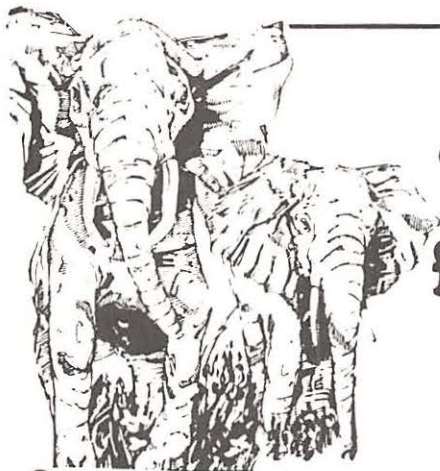
Freq	User	Usage
40.190	AF	OSI
46.650	AF	
49.620	AF	
40.700	Army	Air operations
138.150	AF	(AM mode)
138.450	AF	(AM mode)
139.050	AF	(AM mode)
139.250	AF	(AM mode)
139.300	AF	Operational loan pool
139.900	AF	Operational loan pool

140.170	AF	
140.200	AF	
140.400	AF	(AM mode)
141.000	Navy	Data transmission
141.300	AF	(AM mode)
142.500	AF	O & C Crane ops
142.860	AF	O & C Crane ops
143.040	AF	O & C Crane ops
143.280	AF/CG	CG air channel
143.430	AF	(AM mode)
143.900	AF	Civil air patrol-repeater in
148.035	AF	NASA TV - pool camera production
148.150	AF	Civil air patrol-repeater out
148.250	AF	Satellite uplink
148.485	AF	ETR-6/photo ops
148.515	AF	Titan III ops
149.150	AF	Titan III ops
149.250	AF	(AM mode)
149.900	AF	Data transmission
150.150	AF	Malabar security
150.195	AF	Cape support
150.250	AF	"687 Base"
163.4625	AF	ETR-D Cape security
163.5125	AF	ETR-B Cape SRO
163.5625	AF	ETR-F Cape fire
163.5875	AF	Paging
164.500	AF	ETR-Y Radiation monitoring
165.0125	AF	Paging
165.0375	AF	
165.1125	AF	Command post-repeater
400.050	AF	Data transmission
403.000	AF	Weather balloons
406.500	AF	Data transmission to Atlantic
416.500	AF	ETR Range safety officer to Atlantic
419.150	AF	missiles emergency destruct channel

PATRICK AFB, FL

Freq	User	Usage
2.0000	AF	
2.7165	NASA	
3.1830	AFRES	
4.4490	AF TAC	
4.5600	AF SAC	U-2 ops
4.7600	AF TAC	
4.8250	NAVY	
5.2910	AF	
7.9850	NAVY	
9.2530	NAVY	
11.547	AF AFSC	
15.575	AF MAC	
18.990	NAVY	
38.650	AF(KSC)	Air-to-air
40.150	AF AFRES	Air-to-ground
41.950	AF	Air-to-air "TAC OPS"
46.650	AF(KSC)	Air-to-air ARRS
46.850	AF TAC	Air-to-air
49.750	AF MARS	
49.850	AF MARS	
119.250	AF	Approach/departure PAFB ATC, channel 12 (paired with 358.3)
120.950	NAVY	Sealord -- PAFB site (paired with 267.5)
121.700	AF	PAFB ground control, channel 01 (paired with 335.8)
125.100	AF	Approach/departure PAFB ATC channel 03 (paired with 340.9)
126.200	AF	PAFB tower channel 02 (paired with 348.4)
126.400	USCG	Air-to-ground channel (zone control)
128.800	AF	PAFB dispatcher/base operations (paired with 372.2)
135.825	NAVY	Sealord secondary channel
138.075	AF CID	OSI channel B
138.175	AF CID	OSI channel A

[continued on page 101]



Trunk Busting Basics for Scanner Listeners

by Bob Kay

According to a recent newspaper headline, the hobby of scanning was dying. "New Trunked Radio System Prevents Home Monitoring of Police Calls." After reading the article, it was evident that the reporter was not too well informed. Here was a reporter who actually thought that a ten channel, computer-controlled trunked radio system could keep listeners from tuning in their local police and fire departments. Ha! He had obviously never heard of *Monitoring Times'* highly secretive "Trunk Busters" team.

"The 450 MHz scanner is quickly becoming obsolete," said the reporter. And here is my favorite: "Owners of scanner radios may soon be selling them at flea market prices."

Yes, the reporter's findings were incorrect but it is easy to understand why most people believe that trunked monitoring is impossible. Even serious scanner buffs have written to *MT* expressing their frustrations when attempting to monitor local trunked systems.

Readers Worried

"In my area," one letter began, "the police and fire department, along with the dog catcher and the board of health, are all using the same trunked system. When my scanner pauses on an active channel, it could be any one of the four agencies -- can you help?"

Another reader asked the following questions.

"Can the entire conversation of one agency be followed through a trunked system? If so, can it be accomplished without any special equipment, other than a conventional scanner radio?"

The answer to all the above questions is a resounding yes! Any one agency in a trunked system can be accurately moni-

tored. To discover the secrets of trunked monitoring, we must first learn how the system works. Once the basics are understood, it then becomes much easier to apply a specific listening technique that will allow us to hear all the action.

Trunk Buster Basics

In a trunked system there are ten channels that may be assigned to both the police and fire department. In some cases, other agencies may also be assigned to the same ten channels.

All of the mobile and base units are programmed to operate on any of the ten channels. Similar to cellular phones, the programming and switching of frequencies is accomplished by the aid of computers. Unlike cellular phones, the trunked system will not switch to another frequency in the middle of a conversation.

In the trunked system, everyone has the ability to communicate simultaneously with all the other units in the system. This feature is primarily useful when police departments must broadcast an "all points bulletin."

When a mobile user presses the microphone button, the radio automatically tunes to an empty channel. At the repeater site, a computer then tunes the base radio to the mobile units channel. If all the channels are busy, a flashing "busy" light will be activated in the mobile unit.

One of the ten channels will be designated as a "signaling channel." Each time the microphone button is pressed, a burst of encoded information is sent to the computer. The computer uses this information to determine the status of the patrol car and to provide the base operator with the vehicle identification number. In an emergency, an officer only has to press a button and the dispatcher will instantly know the

ID of the unit in trouble.

In addition to signaling channels, some trunked systems may also utilize "data channels." These channels are used to transmit the more routine services such as arrivals and departures from an accident scene, in/out service calls and vehicle identification checks. On some systems, officers can instantly access vehicle license plate information from a small console that is mounted within the vehicle.

Monitoring Conversation Channels

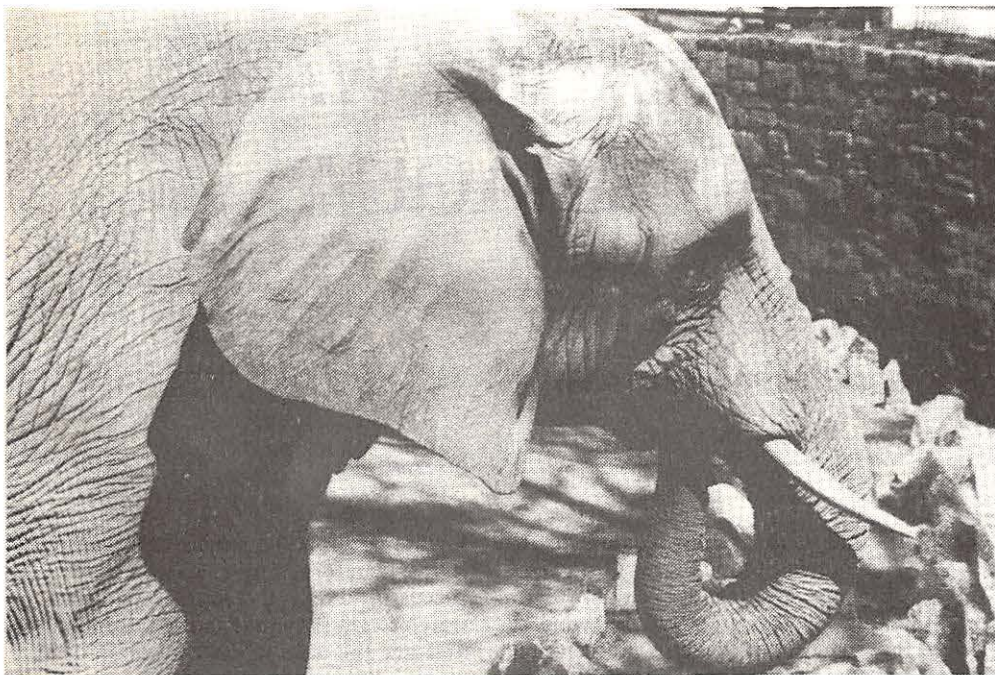
The remaining channels that are not used for signaling or data purposes are called "conversation channels." Since only the conversation channels can be heard on our scanners, the other nonvoice channels should be "locked out."

On some systems, as many as four channels may be used for signaling and data transfer. Once these are locked out, it isn't that difficult to monitor the remaining six voice channels.

However, be advised that both the signaling and data channels will change from day to day. To be successful, the scanner buff must determine the active voice and data channels on a daily basis.

The "delay" feature on your scanner should be deactivated. As mentioned earlier, the trunked system will not switch channels in the middle of a conversation. But it may change channels as soon as the user releases the microphone button. Use of the delay function will not allow the scanner to follow the conversation to the next channel.

In order to hear the entire conversation of one agency, several scanning radios with lightning fast scan rates are needed. Two Regency Turboscan 800s would be ideal. At first, it may be a little confusing, but your



Trunk busting means the scanner no longer does all the work. We must get actively involved in the process.

ear will quickly become accustomed to following a single conversation as it is randomly selected between two or more scanners.

Active Listening

Scanning in this manner is rather exciting. But gone are the lazy days of idle listening on just a few channels. Trunked scanning demands that we sit on the edge of our chairs and become actively involved in the scanning process.

When using scanner radios with conventional scanning rates, repeated pressing of the scan buttons may be necessary in order to follow a specific conversation. The first few words of the transmission may be lost, but the main body of the communication will be heard.

Recording the conversations of any one agency would be difficult. Since there is no way of determining what channel the computer may select, accurate recordings would require multiple tape players and some very monotonous editing procedures.

Each manufacturer's trunked system is different. No two systems can operate together. As a result of this, no two systems can be monitored in exactly the same manner. To explain the trunking basics, the Motorola system was described above.

Monitor Them All

In the Johnson trunked system, both the signaling and voice channels occur on the same channel. This is done by transmitting the signaling information on a frequency range just below the speech frequency.

However, don't become discouraged. On a very basic level and in regards to scanning, all the systems can be monitored by using the procedures that have just been explained.

It really doesn't matter what channels are used (if any) for signaling or data transfer. If they are present, lock them out. If they can't be found, simply concentrate on monitoring all ten channels.

In addition to Motorola and Johnson, Midland, Uniden and a long list of other manufacturers have all introduced their own line of trunked systems.

If you are really interested in monitoring locally trunked transmissions, try to discover the type of system being used. It then becomes a simple matter of reviewing the manufacturer's specifications and tailoring your skills to fit the mold.

Prior to the introduction of trunked radio communications, we became accustomed to leisurely enjoying the hobby without physically becoming involved. Most of us scanned alone in a separate room, from

behind closed doors.

Aggressive Posture Needed!

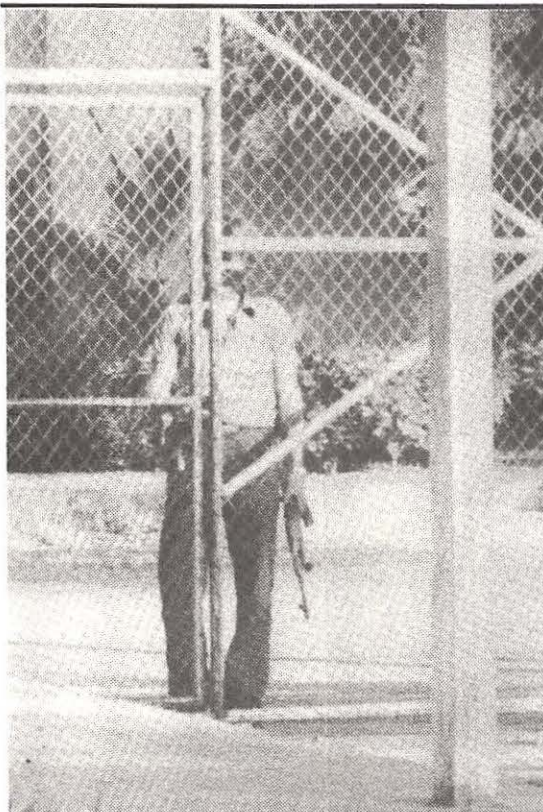
The scanning of trunked communications requires the scanner buff to aggressively attack the system with sharp ears, quick reflexes and with multiple radios that must be manually manipulated.

Very often, when the action gets really hot, it may be a good idea to scan with a friend. Two enthusiasts, listening and controlling several groups of scanner radios, can really get a handle on everything that is happening.

But don't be too eager to share these methods with just anyone. Scanning becomes much more intriguing when the parties involved believe that no one is listening. Don't you agree?



Editors Note: At this writing, there are no scanning aids that can be purchased to make trunked monitoring any easier. Several electronic engineers are currently attempting to develop a computer program that could analyze, sort and individually list each transmission as rapidly as it is being transmitted. However the concept remains only a theory. If developed, it would require a highly refined, computer compatible scanner radio. Prospects for seeing this on stores shelves in the foreseeable future remains remote.



An AK47 guards the gate to La Voz de Nicaragua

The wars in Central America are fought on the airwaves as well as on the ground, and monitors have front row seats. But tuning in on the radio war has had a frightening side as well, for those on the Contras' deathlist.

With the Arias peace plan and the negotiations between the Contras and the Nicaraguan authorities, the shooting war seems to be over. But the media war is still just as exciting.

Radio Sweden's DX Editor George Wood has visited Nicaragua and Costa Rica, together with Swedish journalist Hermos Pedersen, an expert on Latin American DXing.

"They read the names of people on their deathlist on the radio," Swedish foreign aid worker Bengt Kjeller told us when we met him in Matagalpa, a town in northern Nicaragua near one of the Contra rebel's operations zones. "My name was one of them."

Bengt Kjeller is a popular man among the farmers of Nicaragua. Representing the

THE RADIO WAR IN NICARAGUA

by George Wood
and Hermod Pedersen

Swedish Cooperative Center, he has helped bring cooperative rural general stores to farmers in more than 100 isolated villages. In 1987 he won the Swedish Development Association's award for the year's best foreign aid project. For his efforts, Bengt Kjeller made the Contra's deathlist.

The chilling listening came from Radio 15 de Septiembre, which broadcasts from Honduras. It is one of dozens of foreign radio stations that can be heard in Nicaragua. Many carry programs opposing that country's Sandinista government. Sometimes the propaganda is subtle, but not on Radio 15.

"They try to keep people from participating in projects, which are aimed at helping the poorest," says Father Marcus Lester, a Roman Catholic priest from Kentucky who we met in a small village outside Matagalpa. "They also use the church and try and convince people that the church is on the Contras' side."

Radio War After Somoza

The radio war escalated soon after the dictator Somoza was driven out by the Sandinist Liberation Front in 1979. The remnants of Somoza's National Guard fled to Honduras and Costa Rica. With a liberal application of CIA money they were reorganized as the Contras. Shortly afterwards, Radio 15 went on the air.

According to *Washington Post* journalist Christopher Dickey, the station, located outside the Honduran capital, Tegucigalpa, also served as a warehouse for CIA weapons -- from rifles and grenades to artillery. Unfortunately, things didn't go exactly as planned. The first station manager stole as much cash as he could get

his hands on, even selling the transmitter tubes, before he disappeared. His successor, Noel Ortiz, had to pawn his watch to get the money to replace the tubes and get the station on the air in 1981.

From the beginning Radio 15 wasn't afraid to abandon the truth. Early broadcasts warned Nicaraguans against the Sandinistas' polio vaccination campaign. The vaccine, Radio 15 warned, would kill the children. When that didn't happen, the station changed its story -- the new line was that the vaccine would turn kids into Commies.

In 1986 the station was joined by La Voz de la UNO, which has a similar message, and a similar format. Whereas Radio 15 is officially the voice of the FDN, the largest Contra group, La Voz de la UNO is supposed to be operated by UNO, the United Nicaraguan Opposition, the organization intended to unite the various Contra groups. But strident anti-Sandinista programming on the two stations has tended to damage credibility.

"You can hear them here," we were told by coffee farmer Ramon Amador in Jinotega in northern Nicaragua. "But very few people listen, since they lie so much."

This lack of credibility has led the Contras to start yet another station, with American help. Radio Liberacion went on the air at the beginning of last year on medium wave 1520 kHz, with a 50 kw transmitter believed to be broadcasting from El Salvador. The money to run the station came from the controversial 100 million in aid to the Contras approved by Congress.

With a powerful signal that can be heard well in Managua, Radio Liberacion is one of the Contras' most important weapons in



the war against the Nicaraguan government. When the Sandinistas overthrew the dictator Somoza in 1979, only 15 percent of the population could read and write. The combined circulation of the country's newspapers before the revolution was less than 60,000. That compares to more than 500,000 radio receivers.



Many Stations to Choose From

In Nicaragua, radio is the most important means of communications.

But the country's own resources are meager, compared with the inflow from abroad. According to a study by Howard Frederick of Ohio University, in 1985 at least 75 foreign medium wave and FM radio stations could be heard in Nicaragua. Twenty-six of these were in Costa Rica, 18 in Honduras, and four (before the advent of Radio Liberacion) in El Salvador. In addition, there are the shortwave broadcasters - such as Radio 15.

International telecommunications expert Frederick says in his report: "In the U.S. military doctrine of 'low-intensity warfare,' political, economic, and psychological weapons are the primary means of

aggression. Especially important are the channels of electronic communication, used so easily to disinform and destabilize."

VOA: Weapon in American Arsenal

The Voice of America has also become a weapon in the war on Nicaragua. The Reagan administration has allocated two billion dollars to expand the VOA in the

"They read the names of people on their deathlist over the radio. My name was one of them."

-- Swedish foreign aid worker
Bengt Kjeller

Caribbean basin. The Marnandate-II report prepared by pro-Reagan groups says "the administration has developed and strengthened the Voice of America, realizing that it is an important and effective tool for public U.S. diplomacy that we must use extensively in the war of ideas."

A VOA relay station was installed in 1985 in northern Costa Rica. With an output power of 100 kw, it is one of the most powerful medium wave stations in Central America, and can be easily heard in Nicaragua. To put the station on the air, the VOA circumvented Costa Rican law, which prohibits foreign individuals or organizations from operating radio stations in the country.

The VOA organized a group of sympathetic local business executives and politicians, which officially owns the station. However, 60 percent of broadcasts are VOA relays. The rest are carried in the name of "Radio Costa Rica."

The VOA escalation against Nicaragua has continued as well -- the Honduran government has approved a new VOA relay station in San Lorenzo, just a few miles from the Nicaraguan border.

Perhaps the biggest media threat to Nicaragua comes from Radio Impacto, a legal station operating from a suburb of the Costa Rican capital, San Jose. Radio Impacto was started in 1983 by men who had owned stations in Nicaragua during the Somoza dictatorship. According to the Central American Historical Institute at Georgetown University, the station has had close connections with the Contra movement (ARDE) formerly headed by Eden Pastora. But when we met the current head of the Contreras there, Alfredo Cesar, he denied any relationship.

"We have no connection with Radio Impacto or any other radio station in Costa Rica," he told us.

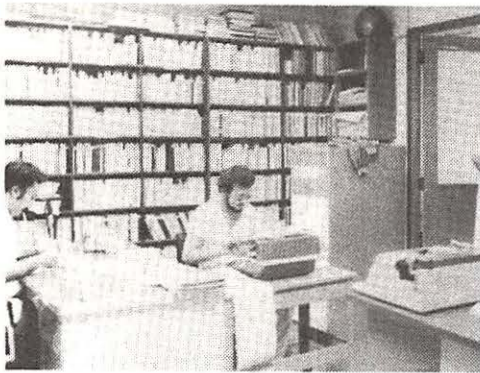
We tried to visit the station several times, but were refused permission.

Alternative Voices

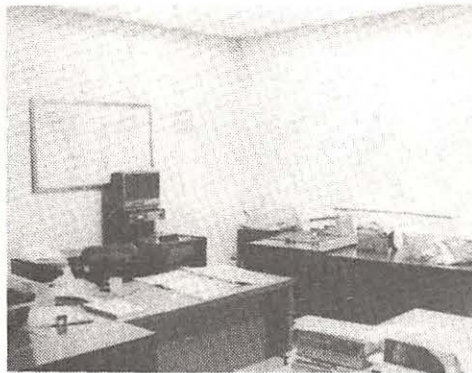
Radio Impacto tries to be an alternative radio service for Nicaragua. It has professional announcers, and concentrates on current music and round-the-clock news.

"Radio Impacto is our most important competition," we were told by Adrian Roque, who heads the News Department at Nicaragua's major public broadcaster, La Voz de Nicaragua. "We're forced to be better, especially in our news coverage."

Against the battery of propaganda broadcasts from abroad, Nicaragua has 50 radio stations, of which two are religious and another 31 are in private hands. Of the 17 public broadcasters in Nicaragua, only two



Domestic Service Newsroom



English language newsroom



Voz de Nicaragua master control

-- Radio Sandino and La Voz de Nicaragua
-- even approach national coverage.

Ironically, La Voz de Nicaragua was started by the American Marines in 1931 as Radio Nacional. It was seen as a weapon in the war against Augusto Sandino's guerilla army. The Somoza family ran Radio Nacional until the revolution in 1979, along with 16 other stations.

Most of the smaller stations confiscated from the Somozas have been organized as the Peoples' Radio Broadcasting Corporation, CORADEP.

These small local stations have limited coverage areas, and concentrate on popular music. For example, Radio Paz in Managua plays mostly Easy Listening music, while Radio Tropical has a Caribbean music format.

La Voz de Nicaragua is clearly the most popular station in the country, at least in those parts of the country where it can be heard.

"We try to really be the voice of the people," Adrian Roque says. "We make the programs people want and play the music they like, whether it is cumbia, breakdance, or Michael Jackson."

Contact with listeners is important at La Voz de Nicaragua. The two most popular programs are called *Contacto 620* and *Hablamos*; talk shows where listeners are put live on the air, either from La Voz's jeeps, which travel around the capital, or by calling themselves. The programs specialize in airing complaints about public agencies.

"The listeners can complain about anything they want. Then we call up the responsible authorities, and let them respond to the criticism on the air," says Adrian Roque.

Nicaragua Abroad

La Voz de Nicaragua is also the country's voice abroad, with broadcasts in both

Spanish and English. Both services share one small room. Paula Dobbyn, one of the three members of the English group, came to Nicaragua with a construction brigade. When the brigade returned to the U.S. after a few weeks, she stayed in Nicaragua to pick coffee. Eventually she joined La Voz de Nicaragua. Like the other members of the group, she has no previous experience in radio.



Barney Romero

"The biggest problems are the lack of equipment and the lack of experience," she told us. "Besides Barney Romero, the head of the English collective, we've had five or six people from North America or Britain working here. No one had any experience in radio, except for one person who had worked in college radio."

The hour long programs concentrate, as might be expected, on Nicaragua and the situation in Central America.

"We start off with headlines and a main

block of news, about what is happening in Nicaragua or in Latin America. Then we usually put in a song. We try to play Nicaraguan music, but sometimes we use Latin music, or even music from the United States. Then we have *Update*, a series of international stories. After that we have a song or an interview."

"This week I interviewed three U.S. Vietnam vets who are here protesting the United States' policies in Central America. Before that we covered the Hasenfus trial. Each week we try to have an interview in English about what is happening in

"Very few people listen since they lie so much."

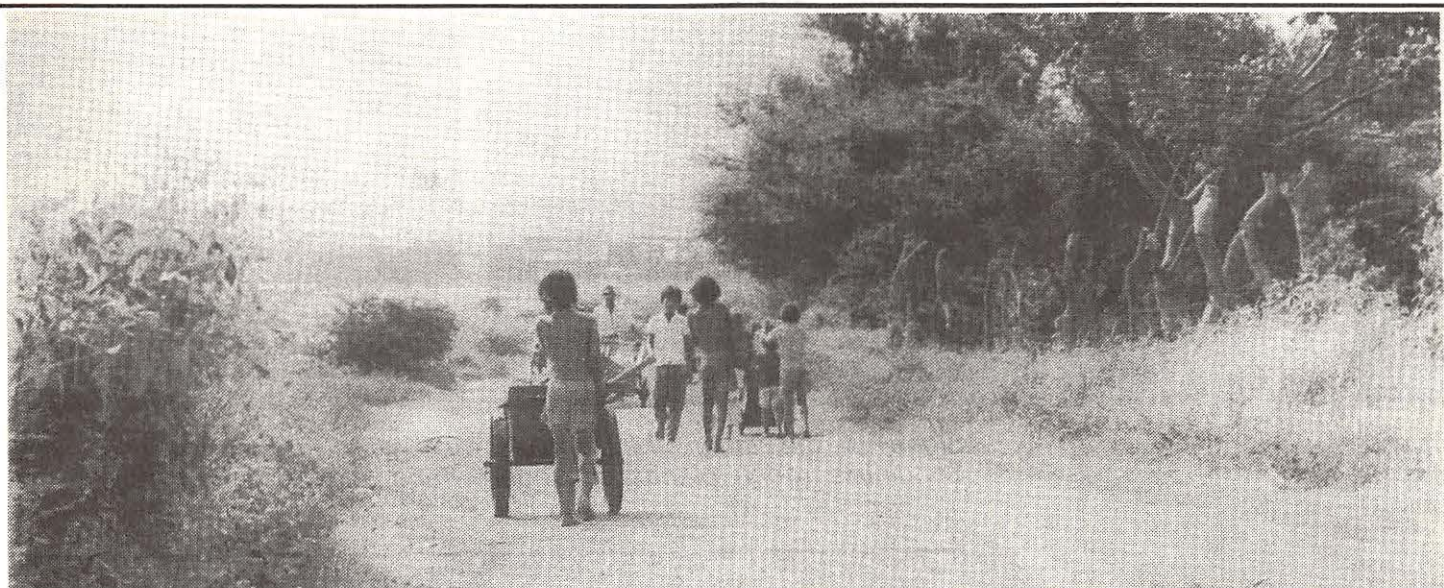
-- Nicaraguan coffee farmer

Ramon Amador

Nicaragua."

The second most popular station in Nicaragua today is Radio Sandino, the station operated by the ruling Sandinist Party. It began as an underground broadcaster in the mountains in 1977 during the struggle against Somoza. After the dictator's fall on July 19, 1979, Radio Sandino took over one of the stations operated by the Somoza family, Estacion Equis in Managua. The 1979 edition of the *World Radio TV Handbook*, in fact, listed Anastasio Somoza himself as the station manager.

Today Radio Sandino is the domestic station heard best around Nicaragua. The 50 kw medium wave transmitter on 750 kHz is the country's strongest. The station has two FM transmitters with a wide coverage area. We could even hear them, sounding like locals, in the hills above Matagalpa, 75 miles away.



The problems concerning the Miskito Indians in eastern Nicaragua, and their demands for autonomy, have led to Radio Sandino's introducing special programs for the Caribbean coast.

These programs are carried over all Radio Sandino transmitters, so that the Spanish-speaking residents in the west for the first time have an opportunity to hear news and music from the remote eastern part of the country.

"We have to tell people about what is happening there," explains the head of information at Radio Sandino, Maria Eugenia Urroz.

Voice of Sandinist Party

Radio Sandino is first and foremost the station of the Sandinist Party. Even the news is affected by the party's priorities. Radio Sandino would never dream of carrying news about the military situation until after

checking first with the military authorities.

"We wait until we have their approval before we carry military news," Radio Sandino News Director Educando Romero told us. "There is a chance that some items get old, that a station like Radio Impacto will have it first. But we wait anyway until we have it confirmed. We think that's more important than being first."

La Voz de Nicaragua has a different policy. Because it has to compete with Radio Impacto, La Voz doesn't always wait for confirmation from the authorities.

"We try to work with the military," La Voz's News Director, Adrian Roque, says. "But we also have to think of the listeners, and if something important happens we put it on the air without waiting for approval. We try to be independent."

The majority of Nicaragua's radio stations, 33 altogether, are nonpublic, either privately owned or operated by the Roman

Catholic Church. Several are openly critical of the government. Before the Arias peace plan there was a censorship law in Nicaragua, but it was not applied to radio stations (probably because of the difficulty of enforcement).

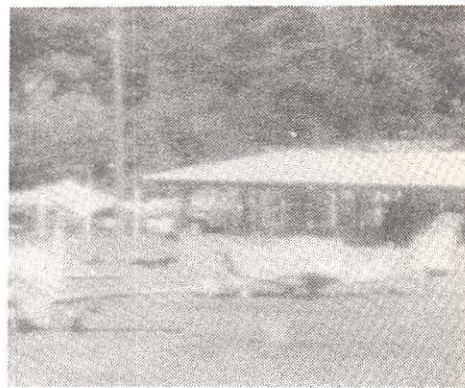
Some Stations Closed

Three stations, however, were closed after the Sandinistas came to power in 1979. Radio Amor and Mi Preferida were closed in 1981, accused of having carried false reports that Nicaraguan troops had invaded Honduras.

One of the Catholic Church's two stations, Radio Catolica, was closed in 1986 for failing to follow the radio regulations, by failing to broadcast President Daniel Ortega's State of the Nation speech.

The station said this was due to technical problems and that parts of the speech were in fact broadcast.





Signs of the times: McDonald's vies with Russian Aeroflot, while Sandinista recon planes sit under wraps (clandestine photo)

When we asked President Ortega about the closure of Radio Catolica, he said nothing about his speech, but instead criticized the station's programming: "Radio Catolica supported the attitude that can be found within the church hierarchy in Nicaragua that the revolution can only lead to atheism. For that reason, they believe that any means can be used to destroy the revolution. This we cannot accept."

Under the Arias peace plan, Radio Catolica was allowed to reopen in October, 1987. The Sandinist government also withdrew earlier restrictions on news broadcasts by nonpublic stations.

But in early May, the Nicaraguan government closed Radio Catolica for one week and another opposition station, Radio Corporacion, for one day after the stations had wrongly reported that a trade unionist was dead. On May 20, the government banned four news broadcasts from Radio Catolica for spreading what was called "false information" about the alleged capture of a town by the Contras in the midst of the cease fire.

Despite the controversy over Radio Catolica, radio is alive and well in Nicaragua. The airwaves around the country are filled with news, music, and -- not least -- propaganda. Because much of the radio war is being fought on shortwave, listeners in North America can monitor the struggle from their armchairs. Buen escucho!

George Wood is the DX editor for Radio Sweden. Photos are courtesy of Susan Merritt.

The Radio War in Nicaragua: Stations to Look For

Nicaraguan Stations:

LA VOZ DE NICARAGUA -- Has operated on around 6015 kHz. A new, more powerful transmitter has gone on the air on 6100 kHz. English has been carried at 01:00 and 04:00 hours, most recently 03:00-04:00. Address: Frente Telcor, Villa Panama, Managua, Nicaragua, or Box 248, Managua, Nicaragua.

RADIO SANDINO -- 750 kHz. The shortwave transmitter listed on 6160 kHz is off the air because of a lack of parts. Address: Ap. 4776, Managua, Nicaragua, or Paseo Tiscapa, Managua, Nicaragua.

RADIO ZINICA -- in Bluefields on Nicaragua's Caribbean coast, uses 6120 kHz. Address: Ap. 25 Bluefields, Nicaragua.

Contra Stations:

RADIO 15 DE SEPTIEMBRE -- has been heard on many frequencies, including 5555, 5565, 5570, 5950, 6130, and 6215 kHz. News in English is reported at 02:00 hours. Address: FDN, 1999 Thomas Jefferson St., Suite 605, Washington, DC 20007, or FDN, Box 16-0953, Miami, FL 33116, USA.

LA VOZ DE LA UNO -- Most reported on 5889 kHz, but also 5950. Address: same as above, or possible ARDE, Apartado 348, 1000 San Jose, Costa Rica.

RADIO MISKUT -- broadcasts programs in Miskito and Spanish to Nicaragua's Atlantic coast. Reported irregularly from 11:30 hours on 5950 and 5565 kHz, and at 21:00 and 01:30 hours and 6265 kHz. Address: same as above, or Comision Politica MISURA, Ap. Postal 1668, Tegucigalpa, Honduras.

RADIO MONIMBO -- 6230 kHz, said to have been founded by the son of the martyred publisher Joaquin Chamorro. Reported irregularly.

RADIO IMPACTO -- 6150 kHz, sometimes on 6160 or 6140 kHz, and even reported on 5030 kHz. Address: Ap. 497, San Pedro de Montes de Oca, Costa Rica.

RADIO LIBERACION -- 1520 kHz, broadcasts 00:00-12:00 hours.

Mercenaries fighting in Central America have been reported to be using 6593 kHz in SSB around 00:00 hours UTC and 6622.5 kHz around 00:45.



uniden®

\$12,000,000 Scanner Sale

Uniden Corporation of America has purchased the consumer products line of Regency Electronics Inc. for \$12,000,000. To celebrate this purchase, we're having our largest scanner sale in history! Use the coupon in this ad for big savings. Hurry...offer ends December 31, 1988.

★ ★ ★ MONEY SAVING COUPON ★ ★ ★

Get special savings on the scanners listed in this coupon. This coupon must be included with your prepaid order. Credit cards, personal checks and quantity discounts are excluded from this offer. Offer valid only on prepaid orders mailed directly to Communications Electronics Inc., P.O. Box 1045 - Dept. UN19, Ann Arbor, Michigan 48106-1045 U.S.A. Coupon expires December 31, 1988. Coupon may not be used in conjunction with any other offer from CEI. Coupon may be photocopied. Add \$9.00 for shipping in the continental U.S.A.

Regency TS2-T\$259.95
Regency TS1-T\$189.95
Regency INF1-T\$119.95
Regency INF5-T\$79.95
Regency HX1500-T\$159.95
Regency UC102-T\$109.95
Regency RH606B-T\$419.95
Bearcat 200XLT-T\$249.95
Bearcat 100XLT-T\$184.95
Bearcat 800XLT-T\$249.95
Uniden TALKER-T\$179.95

★ ★ ★ VALUABLE COUPON ★ ★ ★

NEW! Bearcat® 760XLT-T

List price \$499.95/CE price \$244.95/SPECIAL
12-Band, 100 Channel • Crystalless • AC/DC
Frequency range: 29-54, 118-174, 406-512, 806-956 MHz.
Excludes 823.9875-849.0125 and 868.9875-894.0125 MHz.
The Bearcat 760XLT has 100 programmable channels organized as five channel banks for easy use, and 12 bands of coverage including the 800 MHz band. The Bearcat 760XLT mounts neatly under the dash and connects directly to fuse block or battery. The unit also has an AC adapter, flip down stand and telescopic antenna for desk top use. 6-5/16" W x 1 1/4" H x 7 3/4" D. Model BC 590XLT-T is a similar version without the 800 MHz band for only \$194.95. CTCSS squelch option now available.

SALE! Regency® TS2-T

List price \$499.95/CE price \$269.95/SPECIAL
12-Band, 75 Channel • Crystalless • AC/DC
Frequency range: 29-54, 118-175, 406-512, 806-950 MHz.
The Regency TS2 scanner lets you monitor Military, Space Satellites, Government, Railroad, Justice Department, State Department, Fish & Game, Immigration, Marine, Police and Fire Departments, Aeronautical AM band, Paramedics, Amateur Radio, plus thousands of other radio frequencies most scanners can't pick up. The Regency TS2 features new 40 channel per second Turbo Scan™ so you won't miss any of the action. Model TS1-T is a 35 channel version of this radio without the 800 MHz band and costs only \$199.95.

Regency® RH256B-T

List price \$799.95/CE price \$299.95/SPECIAL
16 Channel • 25 Watt Transceiver • Priority
The Regency RH256B is a sixteen-channel VHF land mobile transceiver designed to cover any frequency between 150 to 162 MHz. Since this radio is synthesized, no expensive crystals are needed to store up to 16 frequencies without battery backup. All radios come with CTCSS tone and scanning capabilities. A monitor and night/day switch is also standard. This transceiver even has a priority function. The RH256 makes an ideal radio for any police or fire department volunteer because of its low cost and high performance. A 60 Watt VHF 150-162 MHz version called the RH606B-T is available for \$429.95. A UHF 15 watt, 16 channel version of this radio called the RU156B-T is also available and covers 450-482 MHz. but the cost is \$454.95.

★ ★ ★ Uniden CB Radios ★ ★ ★

The Uniden line of Citizens Band Radio transceivers is styled to complement other mobile audio equipment. Uniden CB radios are so reliable that they have a two year limited warranty. From the feature packed PRO 810E to the 310E handheld, there is no better Citizens Band radio on the market today.

PRO310E-T Uniden 40 Ch. Portable/Mobile CB...\$83.95
PRO330E-T Uniden 40 Ch. Remote mount CB...\$104.95
PRO500D-T Uniden 40 Channel CB Mobile...\$38.95
NINJA-T PRO310E with rechargeable battery pack \$99.95
B10-T 1.2V AA Ni-Cad battery for Ninja (set of 10)...\$20.95
KARATE-T Uniden 40 channel rescue radio...\$53.95
PRO510XL-T Uniden 40 channel CB Mobile...\$38.95
PRO520XL-T Uniden 40 channel CB Mobile...\$56.95
PRO540E-T Uniden 40 channel CB Mobile...\$97.95
PRO640E-T Uniden 40 channel SSB CB Mobile...\$137.95
PRO710E-T Uniden 40 channel CB Base...\$119.95
PRO810E-T Uniden 40 channel SSB CB Base...\$174.95

★ ★ ★ Uniden Radar Detectors ★ ★ ★

Buy the finest Uniden radar detectors from CEI today.
TALKER-T Uniden talking radar detector...\$184.95
RD7-T Uniden visor mount radar detector...\$99.95
RD9-T Uniden "Passport" size radar detector...\$114.95
RD9XL-T Uniden "micro" size radar detector...\$144.95
RD25-T Uniden visor mount radar detector...\$54.95
RD500-T Uniden visor mount radar detector...\$74.95

Bearcat® 200XLT-T

List price \$509.95/CE price \$254.95/SPECIAL
12-Band, 200 Channel • 800 MHz. Handheld
Search • Limit • Hold • Priority • Lockout
Frequency range: 29-54, 118-174, 406-512, 806-956 MHz.
Excludes 823.9875-849.0125 and 868.9875-894.0125 MHz.
The Bearcat 200XLT sets a new standard for handheld scanners in performance and dependability. This full featured unit has 200 programmable channels with 10 scanning banks and 12 band coverage. If you want a very similar model without the 800 MHz band and 100 channels, order the BC 100XLT-T for only \$189.95. Includes antenna, carrying case with belt loop, ni-cad battery pack, AC adapter and earphone. Order your scanner now.

Bearcat® 800XLT-T

List price \$549.95/CE price \$259.95/SPECIAL
12-Band, 40 Channel • No-crystal scanner
Priority control • Search/Scan • AC/DC
Bands: 29-54, 118-174, 406-512, 806-912 MHz.
The Uniden 800XLT receives 40 channels in two banks. Scans 15 channels per second. Size 9 1/4" x 4 1/4" x 1 1/2". If you do not need the 800 MHz band, a similar model called the BC 210XLT-T is available for \$178.95.

Bearcat® 145XL-T

List price \$189.95/CE price \$94.95/SPECIAL
10-Band, 16 Channel • No-crystal scanner
Priority control • Weather search • AC/DC
Bands: 29-54, 136-174, 406-512 MHz.
The Bearcat 145XL is a 16 channel, programmable scanner covering ten frequency bands. The unit features a built-in delay function that adds a three second delay on all channels to prevent missed transmissions. A mobile version called the BC560XLT-T featuring priority, weather search, channel lockout and more is available for \$94.95. CEI's package price includes mobile mounting bracket and mobile power cord.

Regency® Informant™ Scanners

Frequency coverage: 35-54, 136-174, 406-512 MHz.
The new Regency Informant scanners cover virtually all the standard police, fire, emergency and weather frequencies. The INF1-T is ideal for truckers and is only \$129.95. For base station use, the INF5-T is \$84.95. Order your scanner today.

NEW! President® HR2510-T

List price \$499.95/CE price \$239.95/SPECIAL
10 Meter Mobile Transceiver • Digital VFO
Full Band Coverage • All-Mode Operation
Backlit liquid crystal display • Auto Squelch
RIT • Preprogrammed 10 KHz. Channels
Frequency Coverage: 28.0000 MHz to 29.6999 MHz.
The President HR2510 Mobile 10 Meter Transceiver made by Uniden, sets a new standard in amateur radio communications. Fully Featured-The HR2510 has everything that you need. Up to 25 Watt PEP USB/LSB and 25 Watt CW mode. Noise Blanker. PA mode. Digital VFO. Built-in S/R/MOD/SWR meter. Channel switch on the microphone, and much more! The HR2510 lets you operate AM, FM, USB, LSB or CW. The digitally synthesized frequency control gives you maximum stability and you may choose either pre-programmed 10 KHz. channel steps, or use the built-in VFO for steps down to 100 Hz. There's also RIT (Receiver Incremental Tuning) to give you perfectly tuned signals. With receive scanning, you can scan 50 channels in any one of four band segments to find out where the action is. Order your HR2510 from CEI today.



BC760XLT
800 MHz.
mobile scanner
SPECIAL!

★ ★ ★ Uniden Cordless Phones ★ ★ ★

A major consumer magazine did a comparison study on cordless phones. The check points included clarity, efficiency and price. Uniden was rated best buy.

XE700-T Uniden Cordless Phone with speaker...\$95.95

★ ★ ★ Extended Service Contract ★ ★ ★

If you purchase a scanner, CB, radar detector or cordless phone from any store in the U.S. or Canada within the last 30 days, you can get up to three years of extended service contract from Warrantech. This service extension plan begins after the manufacturer's warranty expires. Warrantech will perform all necessary labor and will not charge for return shipping. Extended service contracts are not refundable and apply only to the original purchaser. A two year extended contract on a mobile or base scanner is \$29.99 and three years is \$39.99. For handheld scanners, 2 years is \$59.99 and 3 years is \$79.99. For radar detectors, two years is \$29.99. For CB radios, 2 years is \$39.99. For cordless phones, 3 years is \$34.99. Order your extended service contract today.

OTHER RADIOS AND ACCESSORIES

BC55XLT-T Bearcat 10 channel scanner...\$114.95
BC70XLT-T Bearcat 20 channel scanner...\$159.95
BC175XLT-T Bearcat 16 channel scanner...\$156.95
SPECIAL! HX1500-T Regency 55 ch. scanner...\$169.95
R1090-T Regency 45 channel scanner...\$119.95
UC102-T Regency VHF 2 ch. 1 Watt transceiver...\$114.95
BP55-T Regency 16 amp reg. power supply...\$179.95
MA549-T Drop-in charger for HX1200 & HX1500...\$59.95
MA518-T Wall charger for HX1500 scanner...\$14.95
MA553-T Carrying case for HX1500 scanner...\$14.95
MA257-T Cigarette lighter cord for HX12/1500...\$14.95
MA917-T Ni-Cad battery pack for HX1000/1200...\$39.95
BP205-T Ni-Cad batt. pack for BC200/BC100XLT...\$49.95
BB-T 1.2 V AA Ni-Cad batteries (set of eight)...\$17.95
FBE-T Frequency Directory for Eastern U.S.A...\$14.95
FBW-T Frequency Directory for Western U.S.A...\$14.95
ASD-T Air Scan Directory...\$14.95
SRF-T Survival Radio Frequency Directory...\$14.95
TSG-T "Top Secret" Registry of U.S. Govt. Freq...\$14.95
TIC-T Techniques for Intercepting Comm...\$14.95
RRF-T Railroad frequency directory...\$14.95
EEC-T Embassy & Espionage Communications...\$14.95
CIE-T Covert Intelligence, Elect. Eavesdropping...\$14.95
MFF-T Midwest Federal Frequency directory...\$14.95
A80-T Magnet mount mobile scanner antenna...\$35.95
A70-T Base station scanner antenna...\$35.95
A500-T 10 & 11 Meter - 500 Watt antenna...\$38.95
A1300-T 25 MHz-1.3 GHz Discone antenna...\$109.95
USAMM-T Mag mount VHF ant. w/ 12' cable...\$39.95
USAK-T 3/4" hole mount VHF ant. w/ 17' cable...\$35.95
USAK450-T 3/4" hole mount UHF ant. w/ 17' cable...\$35.95
Add \$4.00 shipping for all accessories ordered at the same time. Add \$9.00 shipping per radio and \$4.00 per antenna.

BUY WITH CONFIDENCE

To get the fastest delivery from CEI of any scanner, send or phone your order directly to our Scanner Distribution Center. Michigan residents please add 4% sales tax or supply your tax I.D. number. Written purchase orders are accepted from approved government agencies and most well rated firms at a 10% surcharge for net 10 billing. All sales are subject to availability, acceptance and verification. All sales on accessories are final. Prices, terms and specifications are subject to change without notice. All prices are in U.S. dollars. Out of stock items will be placed on backorder automatically unless CEI is instructed differently. A \$5.00 additional handling fee will be charged for all orders with a merchandise total under \$50.00. Shipments are F.O.B. CEI warehouse in Ann Arbor, Michigan. No COD's. Most items listed have a manufacturer's warranty. Free copies of warranties on these products are available by writing to CEI. Non-certified checks require bank clearance. Not responsible for typographical errors.

Mail orders to: Communications Electronics, Box 1045, Ann Arbor, Michigan 48106 U.S.A. Add \$9.00 per scanner for U.P.S. ground shipping and handling in the continental U.S.A. For Canada, Puerto Rico, Hawaii, Alaska, or APO/FPO delivery, shipping charges are three times continental U.S. rates. If you have a Discover, Visa, American Express or Master Card, you may call and place a credit card order. 5% surcharge for billing to American Express. Order toll-free in the U.S. Dial 800-USA-SCAN. In Canada, dial 800-221-3475. FAX anytime, dial 313-971-6000. If you are outside the U.S. or in Michigan dial 313-973-8888. Order today. Scanner Distribution Center and CEI logos are trademarks of Communications Electronics Inc. Sale dates 9/15/88 - 12/31/88 AD #100188-T Copyright © 1988 Communications Electronics Inc.

For credit card orders call
1-800-USA-SCAN

COMMUNICATIONS ELECTRONICS INC.

Consumer Products Division
P.O. Box 1045 □ Ann Arbor, Michigan 48106-1045 U.S.A.
For orders call 313-973-8888 or FAX 313-971-6000

LIGHTNING!

An Interview by Bob Kay

Faster than a speeding bullet. More powerful than a locomotive. Able to destroy tall buildings in a single flash. Revered by primitive man and captured in early cave drawings, it's the radio listener's nemesis, *lightning!*

Lightning provided our early ancestors with not only a dazzling light show, but with their first encounter with fire. Many years later, in the mid 1700s, lightning attracted the attention of another man, Ben Franklin. A well-known philosopher, statesman and scientist, Franklin announced the invention of his lightning rod in 1753.

He described his invention as being capable of actually discharging a thundercloud. Of course, he also knew that the rod would protect the structure by directing any flashes to the earth, but he considered this ability to be the least important function.

In today's high-tech and fast-paced society, lightning still invokes fear, awe and wonderment. If you've got a radio with an outdoor antenna, however, it's mostly fear that these brilliant slashes evoke. For a well-placed bolt of lightning can turn any

set, regardless of make or model, into a smoldering pile of rubble. In a worst-case scenario, it can kill you and burn down your house.

To keep our readers informed of the more recent developments concerning this phenomenon, *Monitoring Times'* Bob Kay visited the Franklin Institute. Located in center city Philadelphia, the institute is a nationally recognized science museum with a fully operational weather station.

The man in charge of the weather station, Chief Meteorologist Mike Bodner, agreed to sit down with our readers and explain lightning in detail.

What is it?

MT: Dave, to start the ball rolling, can you briefly explain exactly what lightning is?

Bodner: Lightning is a visible electric discharge, occurring in the atmosphere in areas highly charged with static electricity.

MT: How is this static charge produced?

Bodner: Without a very thorough understanding of physics, that's a difficult question to answer. Very simply, lightning is usually associated with the thundercloud, *cumulonimbus*. Each thundercloud is actually composed of a number of smaller clouds. These smaller clouds are called cells. Each cell, as a result of powerful air currents, acts like an electric generator. An individual cell can deliver several amperes of current and when combined, they can charge a thundercloud to 50 million volts above earth potential.

A super charged mass of electricity looking to discharge itself

MT: What causes the sudden flash of lightning to the ground?

Bodner: First of all, we need to understand the terminology. When we discuss lightning, the terms "flash," "ground flash" and several other terms all have separate meanings.

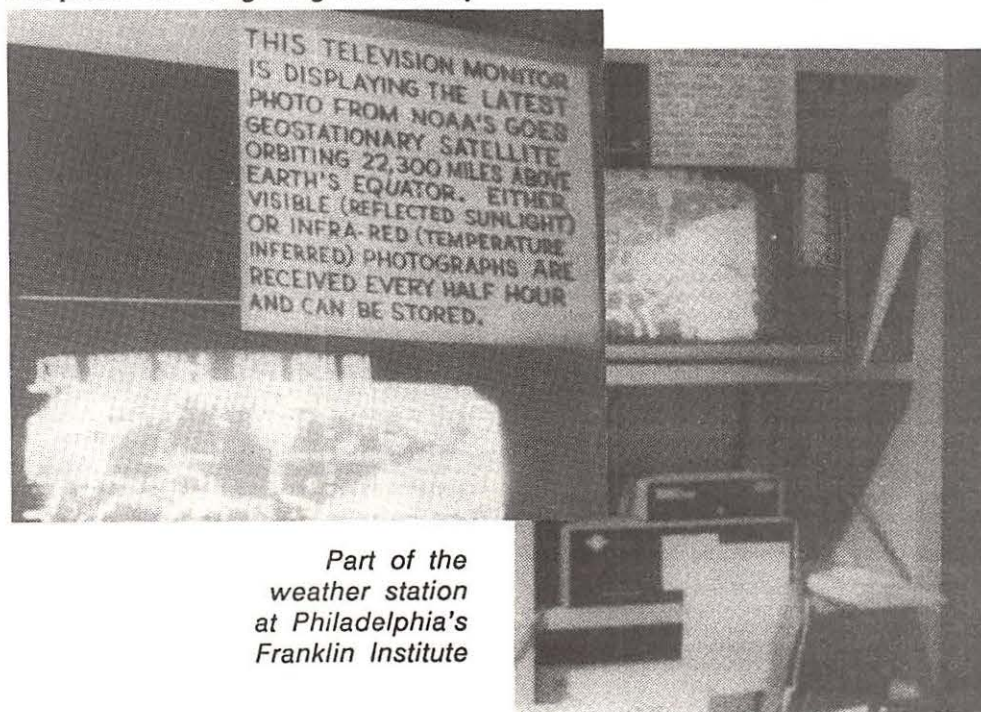
A "flash" of lightning occurs when the charge has increased in the cloud to a point that the insulation of air in the cloud breaks down. This breakdown starts in a very small area, but rapidly spreads upwards and downwards for distances up to a mile.

If lightning strikes the earth, a "ground flash" is the result.

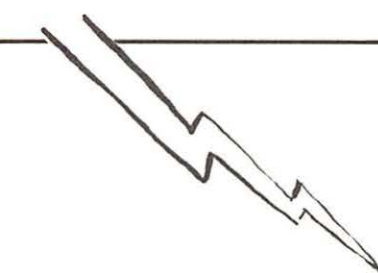
MT: If I understand you correctly, cloud to cloud lightning would be considered a flash and cloud to earth lightning would be considered a ground flash?

Bodner: That's correct. But a ground flash is not that "big bolt" of lightning that lights up the sky and produces thunder.

Before a ground flash occurs, a "leader" discharge travels downward from the cloud and this leader often displays much forking. The leader moves in a series of steps, each step having a length of about 150 feet. When one of the branches of the leader is about 300 feet above the earth, upward "streamers" rise from the ground to meet it. When a streamer meets a leader, the



Part of the weather station at Philadelphia's Franklin Institute



A well-placed bolt of lightning can turn any set, regardless of make or model, into a smoldering pile of rubble.

negative charge from the cloud collapses rapidly into the ground.

MT: The cloud is a negative charge?

Bodner: Yes it is. But it's a "super negative charge." The cloud is so full of electricity that it is sending out leaders seeking to relieve itself.

MT: Something like a huge air balloon -- getting bigger all the time.

Bodner: That's a good analogy. Remember that while the balloon is filling with air, the cloud is likewise filling with its own internally generated electricity.

MT: I'm not quite sure that I understand the cloud as being a negative charge?

Bodner: Don't focus on the negative and positive aspect of all this. A thundercloud is a super charged mass of electricity looking to discharge itself into anything that will provide a path of lesser resistance.

MT: Now, these streamers that rise from the ground to meet the downward traveling leaders, does that produce the "bolt of lightning" that everyone can see during a thunderstorm?

Bodner: As soon as a leader meets a ground streamer, that's when the cloud discharges to the earth. During this leader discharge, there may be a very small amount of thunder, but there will not be any great flashes of light or big thunder claps.

After the cloud discharges to the earth an electrical path from the earth to the cloud is established. This path will only last for a few microseconds but it is long enough for the earth to deliver a return stroke of voltage.

This main discharge, or return stroke, is a pulse of current typically consisting of 20,000 amperes. As a result of the high current, a very bright ground flash is produced. This "earth to cloud" discharge also produces a huge clap of thunder by rapidly heating the air.

MT: Can anyone that watches the night sky during a thunderstorm see the forked leaders extending downward?

Bodner: Yes, they can.

MT: Can we see the ground streamers that rise to meet the leaders?

If the return stroke is 20,000 amperes, what sense does it make to ground an antenna?

Bodner: It is very difficult to see the ground streamer even with ultra high speed photography.

MT: When the cloud discharges to the ground, you're saying that's really no big deal. No large flash, no thunder clap, right?

Bodner: Not when compared to the return stroke!

MT: If the return stroke is typically rated at 20,000 amperes, what sense does it make to ground an antenna? Nothing could survive such a huge surge of current.

Bodner: Although the current is great, it is also very short lived. The average return stroke will fall to only a few tenths of an amp within 100 microseconds of its start. Therefore, very little heating or burning occurs even in thin wires.

MT: Are you saying that we can ground our antennas with speaker wire?

Bodner: Bob, I'm a meteorologist, not an expert in electricity and conductors. But it has been proven that the short life span of the return stroke can be successfully channeled through a very thin conductor.

Here's a good example: Philadelphia Electric is experiencing a very serious problem with mylar balloons shorting out their sub stations. These helium filled party balloons have a one-thousandth of an inch thick aluminum coating. Yet, when they contact an unsheathed cable and then touch something else, a huge voltage transfer takes place in microseconds. The resulting short circuit can place large sections of Philadelphia in complete darkness,

With this fact in mind, the size of a grounding wire should primarily be influenced by

mechanical and common sense considerations, rather than current carrying capacity.

Are the antennas on our homes the same as lightning rods?

MT: Can a properly grounded lightning rod prevent a direct strike?

Bodner: Since the days of Ben Franklin it was commonly thought that a lightning rod could release a sufficient charge into the atmosphere to prevent a lightning strike.

But we now know that this does not happen.

MT: Isn't lightning always attracted to the highest point on or near a structure?

Bodner: Not always. Experts have proven that the attractive range of a vertical rod is no greater than that of a horizontal rod. Modern lightning protection codes rarely recommend vertical rods. Very often, horizontal rods placed along the highest ridges of roofs and spaced at intervals along flat roofs are the approved way to protect a structure.

MT: What exactly do you mean by the "attractive range?"

Bodner: The ability of a lightning rod to conduct a lightning leader is called "the attractive range." The range varies in distance by the amount of charge present on the leader. The higher the charge, the greater the distance.

MT: Is there an average attractive distance?

Bodner: On buildings about 200 feet high the attractive range is about 100 feet.

MT: Since a house is considerably lower to the ground, would the attractive range be less?

Bodner: On the average, yes. But don't forget, the higher the charge the greater the distance.

MT: Could a lightning rod on my neighbor's house protect mine as well?

Bodner: I hardly think that would be possible. The attractive range is not that great.

MT: Ok, here's the million dollar question: Are the antennas on our homes the same as lightning rods?

Bodner: There is a great deal of controversy surrounding that question. Some experts will agree that they are the same.

MT: Personally, how would you relate them?

Bodner: I think there is very little difference. If an antenna is on your home, a leader will probably be attracted to it--just like it would be attracted to a lightning rod.

MT: You mentioned that vertical and horizontal rods would attract lightning equally. Suppose that I have a long-wire antenna just below the peak of my roof or just below the top of my chimney. Will that antenna have the same lightning attracting potential as a vertical antenna of the same length?

Bodner: Again, I'm not an expert in electrical theory. However, if one considers that an antenna and lightning rod are one and the same, then the long-wire antenna would have the same potential for attracting lightning as that of a vertical antenna of the same length.

MT: If we were using both a vertical and long-wire antenna, would the lightning leader be attracted to the vertical element first?

Bodner: That would depend on the location of the lightning leader. If the long-wire antenna terminated some 50 feet away from the home, the leader may be too far away from the vertical antenna and it would strike the wire.

MT: I guess that's where the attractive range comes into play?

Bodner: Yes.

Two or more rods are better than one

MT: What type of earth grounding rod should be used?

Bodner: The grounding rod should be at least four feet long. Six feet would be

better. Using two or more rods is better than one.

MT: Two or more rods connected to the same ground wire?

Bodner: Not only are two or more rods recommended, the ideal rod would have several horizontal elements.

MT: Sort of like an umbrella?

Bodner: Well, the horizontal elements wouldn't need to be more than six inches or so.

This type of grounding rod requires that a hole be dug, the rod lowered in place and then covered over.

When a side flash occurs, it causes a large amount of damage

MT: What precautions should be taken when running the ground wire down the side of a building?

Bodner: Keep the wire on a direct route, sharp bends and kinks are only inviting a "side flash."

MT: What is a side flash?

Bodner: The earth ground will always offer resistance to the grounding rod. Depending upon the amount of current and the amount of resistance, the entire down lead could possibly pass a current somewhere around one million volts.

Naturally, such a high voltage will always be seeking a path of lesser resistance. When the voltage jumps from the wire to other nearby metallic objects, that is called a side flash.

MT: Would aluminum siding on my house cause a side flash?

Bodner: Probably not. Side flashes usually occur when there is a wire way or metal pipe inside the structure. Generally, these objects are also earth grounded.

Side flashes occur because the electrons are trying to find a path of least resistance. If a separately grounded cold water pipe is near the down lead, that might produce a path of lesser resistance to the flow of electricity--thus producing a side flash.

When a side flash does occur, it causes a large amount of damage.

MT: Can a side flash be prevented?

Bodner: Normally grounded objects within close proximity to the grounding wire should all be grounded to the same rod as the antenna or lightning rod. Doing this will cause all the surrounding objects to display the same amount of resistance as the ground wire--thus helping to prevent a side flash.

MT: Then it is of vital importance to check the wire connection to the grounding rod?

Bodner: Yes it is. If that connection becomes corroded, the resistance raises, and side flashes become eminent.

Lightning protection hasn't really changed since Franklin invented the lightning rod

MT: It would seem that although we know a great deal more about lightning, we remain incapable of predicting where it may strike?

Bodner: That's exactly right. We can protect structures from lightning, but we cannot predict strike zones. Sometimes, in spite of our best efforts, a direct strike may occur.

MT: It also appears that lightning protection hasn't really changed since Franklin invented the lightning rod?

Bodner: I guess you're right. If Ben Franklin visited Philadelphia today, he would easily recognize his 1753 invention on top of buildings everywhere.

MT: Can you give us any further hints on protecting our "shacks" from a lightning strike?

Bodner: Don't cut corners when erecting an antenna. Do it correctly and ground it properly. When a thunderstorm does threaten the sky, disconnect all antenna lead-in wires and unplug the equipment.

MT: Anything further?

Bodner: Yes, there is one more suggestion - grab some popcorn and a comfortable chair and enjoy one of the most beautiful and powerful light shows in the universe!



ORDER DESK HOURS (Eastern):
MONDAY-FRIDAY 10 A.M. to 5 P.M.
SATURDAY 10 A.M. to 4 P.M.
 Technical and VA orders call (703) 938-3350

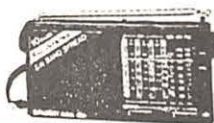
Electronic Equipment Bank
 516 Mill Street N.E., Vienna, VA 22180
 Telephone (703) 938-3350

STORE HOURS (Eastern):
 Same as Order Desk Hours
 Closed Mondays
 Thursday 10 A.M. to 9 P.M.

Electronic Equipment Bank—Order Toll Free 800-368-3270

SMALL PORTABLES

DIPLOMAT 4950 \$69.95 + \$4. UPS



AM 550-1670
 FM 88-108
 11 Shortwave bands
 Stereo headset out.
 OPT. AC adapter
 SPA4.5 \$9.95

SONY ICF-4920 CALL

FM & AM
 7 Shortwave bands
 OPT. AC adapter
 Sony AC-39 \$19.95
 or ACW3...\$9.95



SANGEAN ATS-801 \$99.95 + \$4. UPS



25 Memories
 AM, FM, SW
 Digital readout
 Clock & timers
 OPT. AC adapter
 PA6P \$9.95

TOSHIBA RP-F11 \$89.95 + \$4. UPS

All International
 & Tropical Bands
 'S' Meter
 Safety Lock
 OPT. AC adapter
 PA6P \$9.95



SONY ICF 2003 CALL



150 kHz - 30 MHz
 AM, FM
 Memories, Scanning
 24 hour clock
 OPT. AC adapter
 PA6N \$9.95

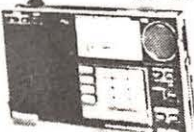
SONY ICF-7700 CALL

FM, LW, MW & 12 Shortwave bands, Clock,
 LCD readout, 15 memories. OPT AC Adapter
 PA6N \$9.95.

PANASONIC RF-B60 \$249.95

\$4. UPS

AM, FM & SW
 36 Memories, Scanning
 Keypad entry, Clock
 LCD Frequency display
 OPT. AC adapter
 PA6N \$9.95



PANASONIC RF-B40 \$179.95

FM, AM & 6 SHORTWAVE BANDS
 Micro: 4 5/16 X 2 3/8 X 7/8"

\$4. UPS

WORLD RADIO TV HANDBOOK

NEW 1988 EDITION!



Listen to the world...hear the voices of people making history...eavesdrop on local programs from around the globe...gain a new perspective on international events. Guides to English broadcasts. Station information including frequencies, transmitter powers, operating times, languages, addresses, etc. Stations listed by frequency in order to help you identify them more easily. The other Shortwave Listener's Bible!

ORDER: WRTVH...\$19.95 POSTPAID!

LARGER PORTABLES

NEW! ATS 803A \$189.95 + \$6. UPS

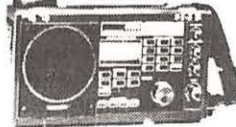
Free Radio Stand



AM, FM, SSB & CW
 LED readout.
 Clock/Timers.
 9 Memories/Scanning.
 Stereo headset out.
 Wide/Narrow switch.
 AC Adapter included!

MAGNAVOX D2935 \$199.95 + \$6. UPS

AM, FM, SSB.
 13 Shortwave bands.
 LED readout.
 Signal meter.
 Many more extras.
Free Radio Stand



MAGNAVOX D2999 \$299.95 + \$8. UPS

AM, FM, SSB, CW/16 Memories.
 Continuous AM tuning 146 kHz-30 MHz.
 LCD readout/Quality 2 speaker sound!

SONY ICF-2010 CALL



AM, FM, SSB, CW & Air
 Band. 32 Memories.
 Scanning. LED readout.
 Clock/Timers.
 AC Adapter included.

GRUNDIG 400 \$399.95 + \$6. UPS



AM, FM, SSB, CW/24 Memories/Scanning.
 LED readout; 24 hr clock; timer.
 Many other features. Best portable audio!
 120/240V or Battery **Free Radio Stand**

ANTENNAS

'EAVESDROPPER'...SWL \$59.95 + \$4.

'DX SLOPER'...DXSWL \$69.95 + \$4. UPS

'DATONG ACTIVE ANTENNA' \$119.95 + \$4. UPS

AD370...\$139.95 + \$4 UPS W/AC Adapter

SONY AN1...\$89.95 + \$4 UPS W/AC Adapter

'MFJ OUTDOOR ANTENNA'

MFJ1024...\$119.95 + \$4 UPS PA1312...\$9.95

FREE EEB CATALOG!

36 Pages over 300 items for the SWLer!

NEW FOR 1988

Many items found only at EEB!

CALL OR WRITE TODAY!

GET ALL THE DETAILS!

DESK TOP RADIOS

NRD-525 \$1169.00 + \$10. UPS



90 kHz - 34 MHz. 200 Memories! Options for
 34-60, 114-174 & 423-456 MHz. 2 Clocks/Timer.
 AM, FM, CW, SSB, RTTY. Many more features.

KENWOOD R-5000 \$799.95 + \$8. UPS



100 kHz - 30 MHz. 100 Memories! Optional 108
 -174 MHz converter. AM, FM, SSB, CW, FSK.
 Scanning. 2 Clocks/Timer. Many fine features.

KENWOOD R-2000 \$579.95 + \$8. UPS

150 kHz - 30 MHz. 10 Memories. Optional 118
 -174 MHz converter. AM, FM, SSB, CW. LCD
 readout. Scanning. 2 Clocks/Timer.

ICOM R-71A \$849.00 + \$8. UPS



100 kHz - 30 MHz. 32 Memories! AM, FM (opt.),
 CW, SSB, RTTY. Scan Memory/Band. Many more
 fine features included! EEB HP Options: Call

ICOM R-7000 \$1019.00 + \$10. UPS

25-1000, 1025-2000 MHz! AM, FM & SSB. 99
 Memories. Full Scanning control. The best
 available under 15K\$! EEB HP Options: Call

YAESU FRG-8800 \$619.95 + \$8. UPS



150 kHz - 29.999 MHz. 12 Memories. Optional
 118 - 174 MHz converter. AM, FM, SSB, CW.
 LCD readout. Scanning. 2 Clocks/Timer.

YAESU FRG-9600 \$499.95 + \$7. UPS

60 - 905 MHz. 100 Memories. AM, FM & SSB.
 Scanning. 'Kuranishi' converters are
 available for 20 kHz - 60 MHz; 800 - 1300 MHz.

PASSPORT TO WORLDWIDE RADIO

NEW 1988 EDITION!

The Shortwave Listener's Bible!



At a glance: Data on every Broadcast station in the Shortwave spectrum! Names, Locations, Frequencies, Operating time, Language, Target area and Transmitter power. All displayed in a convenient easy to read frequency graph form. Buyers guide to more than 90 tabletop and portable receivers. Antenna recommendations. Cross index of major stations alphabetically by country.

ORDER: WBR...\$14.95 + \$1.95 UPS



- We ship world-wide
- Shipping charges not included
- Prices & specifications subject to change without notice

10 miles west of Washington, D.C.
 Sorry—No COD's
 10-5 Tues., Wed., Fri. 10-9 Thursday
 10-4 Saturday Closed Sunday and Monday



ELECTRONIC EQUIPMENT BANK
 516 Mill Street, N.E. Order Toll Free:
 Vienna, VA 22180

800-368-3270

Technical and VA Orders (703) 938-3350

Back to School

by Myles Mustoe, Teacher

The 3 R's: 'Readin', 'Ritin' and 'Radio

In the sixties, when I was in the lower grades, two of the most significant "innovations" in education was color coordinated classrooms and television. Although television broke into education a decade before, it was still an experimental medium for teachers.

I will not forget the day I sat as an elementary student on the hard polished floor of the multi-purpose room watching a screen that visually testified to the fate of John Glenn as he circled the earth. Nor can I forget the black and white images and the sound of drums as President Kennedy was carried to his final resting place. History witnessed on a picture tube was indeed an educational experience.

In those early days of educational television there were many that felt that the medium was the ultimate answer for filling in the creative deficiencies in education. However, did you know that only a short time earlier, educators were saying the same things about radio?

In the 1930s many teachers believed that radio would eventually serve as a substitute for various kinds of teacher instruction. It was used extensively in education. Radio plays and dramas were produced by the thousands by students and programming was developed with educational themes, even on commercial stations.

I mention these early beginnings so that you can easily see that using radio or television in an educational setting is nothing new. But it should also be pointed out how both of these have grown (ironically) stagnant in this modern era of technology and the "information age."

The educational applications of shortwave radio is a good example of this stagnation. Recently, a friend of mine pointed out a newspaper article that touted the satellite television and the potential of some day in the future being able to hear the Russians speaking to us from their own country. Well, every shortwave listener knows that you can hear the U.S.S.R. every day of the week on something much less elaborate and costly than a satellite television.

This vague understanding of shortwave by the public -- and especially by educators -- has severely hindered a potential that already exists for teachers. Using shortwave radio, its programs and its "mechanical" aspects in education should be a natural part of the integration of the information age into the classroom.

Learning by Shortwave

For about the last three years I have been working on identifying some of the skills that can be learned and developed from using the shortwave radio. I have been

applying this research to geographic education at all levels.

The shortwave radio is a perfect tool to use along with the textbook. Students that have never traveled to the lands they are studying may find it difficult to relate to information from textbooks on those places. However, in developing a unit on Taiwan, how could it hurt students to listen to the voices of the people of the Republic of China and interact with them through the mail process?

My elementary as well as secondary students have done this. The textbook is not thrown out but it was augmented with assignments from the radio.



Students thrive on hands-on experiences

SW: Students Can Benefit

I have determined that there are three types of students that will be attracted to radio. One is the student that may have a general or specific interest in the programming. In terms of the curriculum, they may be interested in hearing programs from other lands or hearing languages that they are familiar with.

The second group may relate to the technical curriculum which can be derived out of the shortwave experience. These students build antennas, maintain radios and are interested in the technology of radio.

The third group has no interest and usually has no idea what the radio means in terms of an educational experience.

In some respects this third group can find some of the greatest satisfaction academically and personally. For the first time they may begin to see the world through a different perspective. For some this may be the first and only contact they make with a culture outside their own.



*QSL's are a great incentive
- and the students are
justifiably proud*



Keeping this in mind, and approaching this group objectively can make the shortwave experience something enjoyable for this student.

Learning Center Applications

The shortwave radio lends itself well to "learning center" type applications. In the learning center a radio is set up with a selection of predetermined tasks for the student. These are usually on cards that contain the task, a little about the background of the task, where the student may need to go for additional materials, and how long the task should take to complete.

The learning center is self-contained. That is, everything that the student needs to complete tasks should be available at the center. QSL cards can be used to decorate the center and students should be encouraged to help design the listening area to their preference.

In addition, the learning center helps the students develop responsibilities. Once it is established, it can help the teacher gain some additional time while having some of the students working individually or in groups at the center.

Tasks at the learning center can be changed to accommodate interests and development of the students. You may have ten tasks with technical problems, ten with questions about listening or developing logs. You may be interested in developing writing skills and thus you would have tasks that dealt with verification of stations, addressing heads of state or writing letters to officials on various topics in a list of current events. The important aspect of all of this is that the radio serves as a resource tool for the student.

The shortwave radio is an excellent motivating tool for elementary students as well. These grades thrive on hands-on experiences and with radios that are simple to use this opens up the world to these students. Elementary

students are highly possessive of QSL cards. Shortwave listening provides an excellent avenue for introducing maps and globes. Kids can trace signal paths and get an idea about how distance is measured on the map.

Don't Be Afraid to Experiment

If you are a teacher, don't be afraid to experiment. All kinds of possibilities exist with the use of shortwave in the classroom. Even if you do not use the shortwave in your class, you may want to encourage interested students to pursue their listening adventures as an extracurricular activity. Seek the shortwave listening students out and challenge them to contribute to your classes. Be sure to provide incentives.

One of my favorite stories is that of a young lady who was failing her geography class and began listening to the shortwave radio for the first time. She was so impressed by actually hearing the U.S.S.R. she decided to write to them. A little while later she received a call from Moscow, answering her questions in a special program. It was a real thrill for me as well.

She became interested in shortwave and continued to listen. But the best part of the story is that she passed geography and became more familiar with the world in which she lives. That's the way it is supposed to work.

Happy listening and -- learning.



If you have a story of how radio has played a part in your life or the life of your community, send it to Monitoring Times. If accepted for publication, we'll send you \$50.00. All stories should be real life events. Manuscripts should be approximately 1,000 words and must include at least one clear photograph.

Shortwave Broadcasting

Glenn Hauser

Box 1684 - MT

Enid, OK 73702

Austria: Add another gun-jumper to the 13-MHz band. Radio Austria International has appeared on 13730 between 0700 and 2000 UTC, especially for tourists in southern Europe and the Canary Islands. (Wolfgang Buschel, W. Germany, *DX Listening Digest*) RAI has been experimenting with modulation improvements such as compression on 9875 from 0000 to 0500 and single-sideband after 0300. (*SW Panorama*)

Bangladesh: Radio Bangladesh keeps shifting around. As of July 23, the 1230 to 1300 broadcast in English was on 17710 and 15195 kHz. (Edwin Southwell, England, *SWL Digest*)

Bhutan: BBS, Thimpu, has expanded hours on 5-kilo-watt 6035; Monday through Saturday 1100 to 1500 with English after 1415 UTC; Sunday 0600 to 1000 with English after 0900. Since the Royal Palace wanted P.O. Box 1, BBS's address has changed to Box 101. Buddhist and Adventist religious programs air on Thursdays. (Supratik Sanatani, Calcutta, North American Shortwave Association) Still a dream for most American listeners, Yunnan PBS, China, is heard on 6035 kHz at 1200 UTC. (John Wilkins, Colorado, *Fine Tuning*)

Bolivia: Radio Monteagudo has reactivated 4935, but the ID at 0200 UTC closing is Radio Cordech, La Voz del Desarrollo Chuquisaqueno, Sucre. (Henrik Klemetz, Sweden, *Shortwave Bulletin*)

Brazil: Switzerland on 17730 at 0115 to 0300 reported last month is a relay from Radio Bras. Why it lacks the usual 0.3 second satellite delay compared to 12035 kHz has not been explained.

Burma: BBS, Rangoon, has been testing a powerful new transmitter on 5040 at 1230 to 1600 and 0100 to 0230, partly in English, parallel 5985 and 7185 respectively. (Supratik Sanatani, India, NASWA)

Canada: CBC is re-expanding the program *As It Happens* to a sesquihour. This will cause problems for Radio Canada International's shortwave simulcast scheduling. (*Variety* via Dave Alpert, *DXLD*)

China: Honghe PBS is sometimes active around 1200 UTC on 4930 variable, including relays of Yunnan PBS. Bayenhaote, Inner Mongolia, is often active but irregular between 1030 and 1400 on 6025, seeming to ID as Alashan PBS, including relays in Mongolian of Nei Menggu PBS. (Shibuta, Yamanaka, Gima, Suma, Fujita, Asian Broadcasting Institute via NASWA)

Colombia: Caracol Bogota is back on 4755, announced along with Neiva on 4945 kHz as a service for Colombians abroad; 24 hours. Radiodifusora Nacional can be expected to shift frequencies every few weeks on 16 meters; it plays lots of classical music, instructional courses, and news relays from abroad. The last two were 17841 and 17838.

Costa Rica: In addition to its schedule given last month, Radio for Peace International is starting a Central American service with different programming in Spanish, educational courses for elementary schools, which will be supplied with shortwave radios; on 7375 kHz in the mornings, around 1400 to 1630 UTC. (James Latham, RFPI)

Denmark: Look for activity on the 11 meter band this fall, led by Denmark which planned to use 25850 from September 4 at 1200 to 1250 for Asia. (Bob Padula, *Australian DX News*)

Fiji: Country-collectors would like to fudge this into broadcasting; suit yourself. The University of the South Pacific feeds lectures to other campuses, Mondays at 0500 to 0700 on 9071 SSB; also uses 12140, 9100, 5350. (Bryan Clark, New Zealand Radio Australia Communicator)

Guatemala: Conditions are ripe for more and more right-wing evangelical shortwave stations serving various Indian minorities. (Don Moore, *World of Radio*) TGMUA is up to its old tricks. Reactivated 5982 variable puts a clear harmonic on 17945 variable, best after 0000 UTC. (Ernie Behr, Ontario, *World of Radio*)

Iceland: Add to last month's schedule: 9863 at 1855 to 1930; Saturday and Sunday 0700 on 13770, 15659. (*Sweden Calling DXers*)

Indonesia: Get it while you can: RPDT2 Tapanuli Utara, Balige, Sumatra, plans to shift to mediumwave; until then nominal 3873 varies around 3876 with 500 watts at 0630 to 1600. Radio Republik Indonesia, Jember, has already dropped shortwave 3321. Other RRI news: Surakarta uses two sites, one on 2439 at 1000 to 1700 and 4900 kHz before and after then; another on 4932 at 1100 to 1700. Madiun is on 3286 at 0700 to 1000; Mataram on 3223 at 0900 to 1600; Nabire on 5055 at 0900 to 1300, 6127 at 1300 to 1600; Pontianak on 3345 at 0800 to 1315, 3995 at 1315 to 1515, 3447 after 1515; Tanjung Pinang on 4920 at 0658 to 1215 UTC. (David Foster, *OzDX*)

Italy: Radio Earth said it would begin test transmissions in late August via IRRS (Italian Radio Relay Service), Milan, at various times weekends on frequencies in the 7, 9, and 13 MHz bands. (*DXLD*) Using 7.5 or 10 kw transmitters, omni-L dipole. (Noel Green, Danish Shortwave Clubs International)

Japan: Last-minute changes to the relays of France: 0930 to 1130 on 15215, 1000 to 1100 on 17705, 2300 to 0030 on 17710. (Toru Yamashita, Radio Nederland Media Network) Far East Network is back on 6155 and 15260 kHz after an overhaul. (Rikard Johansson, MN) 9685, not 9665, for Japan via French Guiana at 2200 to 2300. (David Newkirk, *DXLD*)

Korea, South: Hearing Radio Korea coverage of the Olympics should provide a different perspective to seeing it via local TV. Newscasts will be lengthened to provide results and special programs, including *Torch of the Orient*,

Shortwave Broadcasting

September 5-9, and *How Are You, Hodori*, Focusing on athletics, September 10-14. Korean-language service will broadcast the opening and closing ceremonies live. (Lim Kong Jin, Penang, Malaysia) Check 15575 first. English hours are at 2230 on 15575, 0500 on 6060 and 9570, 1300 on 9750. Radio Korea also sends out sheet music to those who would like to sing along in Korean on Fridays. Look for schedule changes, such as a shift to one UTC hour later, once DST ends October 10. (Gerry Bishop, DXLD)

Malaysia: The frequency section correctly shows that Voice of Malaysia broadcasts at 0555 to 0600, 0600 to 0700, 0700 to 0800 and 0800 to 0825 on 15295 kHz, but it took seven years of trying to hear this transmission before succeeding this summer. (Kirk Allen, OK)

Norway: Contrary to an item in June, Radio Norway's Fredrikstad site is still on the schedule this fall, one frequency at a time for 45-minute broadcasts at 0600, 1000, 1200, 1300, 1400, 1600, 1700, 1800, 2000 and 0100 -- including 25730 at 1200 UTC to Africa, keeping Denmark company on the top band. (Bill Dvorak, Don Moore, Kraig Krist, WOR)

Peru: New stations to chase: Radio Frecuencia Lider, Bambamarca, 1.5 kw on 4418.2 kHz at 2250 to 0505. And Radio Tuman, Chiclayo, 4321.1 at 1140 and 0110, from a sugar cooperative. (Pedro F. Arrunategui, Lima, DXLD) The latter must be a third harmonic from mediumwave. (Henrik Klemetz, Sweden, SW Bulletin) DST seems to be local-option; some stations give time in UTC-4, others in UTC-5. (Julian Anderson, Arentina, SWB)

Portugal: Radiodifusao Portuguesa has a new "good-will" news, political, cultural and touristic program, *Good Morning, Europe*, multilingual including English at 0700 to 0830 on 15225 and via Sines on 9615 kHz. (Wolfgang Buschel, W. Germany, RCI SWL Digest)

Saipan: For the first time, KYOI is scheduled on five frequencies during its broadcast day, effective the 25th of this month: from 1800 on 9670, 2000 on 9465, 2200 on 15405, 0200 on 17780 and 0800 to 1600 on 11900 kHz. At times it simulcasts WCSN. (George Jacobs & Associates)

San Martino: Representatives from the Tele Administration have visited Adventist World Radio in Forli, Italy, asking AWR to propose establishment of an international broadcast station here. (Hans Puff, W. Germany, SCDX) Faint aroma of hoax to this, but...?

Turkey: What became of sore thumb 14880? It moved to 9460 at 0400 to 2200. (Wolfgang Buschel, DXLD) Another oddity logged once: 11385 kHz at 2115 to 2155. (Bill Peek, NC, DXLD) Listen for English news during Turkish home service at 0600, 0900, 1400, 1600 and 1900 UTC. (Don Rhodes, Australia, ADXN)

USA: AFRTS may be abandoning shortwave, but it has been and will continue to be available from International Vacuum on Satcom 2 (FT-2), transponder 22-horizontal, sub-carrier 5.94 MHz. (George S. Thurman, WOR) Better than nothing, but lugging a dish along on domestic and overseas travels isn't very practical. AFRTS belatedly started carrying National Public Radio's *Weekend Edition*, Saturday

and Sunday at 1206 to 1359 UTC.

From September 25, KVOH, Los Angeles, plans to use 13695 instead of 9495 after 0100 UTC. (GJ&A)

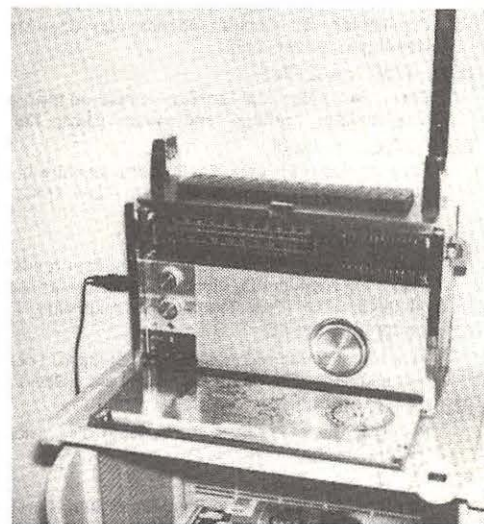
USSR: Baku, Azerbaijan, has been heard with fair signals at 0745 UTC on 28710 kHz, the sixth harmonic of 4785. (Mark Hattam, UK, WDXC Contact) Hams hardly use 10 meters above 28550 or so; this will stand out if it reaches North America after sunrise.

Venezuela: Radio San Cristobal expects to activate 9570 with 1 kw, says the station to the *World Radio TV Handbook*. (DSWC Shortwave News)

Zaire: You want a relay here? You can have it, no further discussion necessary, says billionaire President Mobutu to Voice of America director Richard Carlson during a visit to Washington. (Jack Anderson's column)

BLANDX is back with a third edition. A full-length parody of a DX club bulletin. For loads of laughs, order one now for \$2 in North America, \$3 or 8 IRCs elsewhere from Don Moore, H-2 1/2 Columbia Avenue, Athens, OH 45701.

From Bob Moore of Lakewood, Colorado: My "listening post." Not much, huh? Let me explain. I bought the 26 year old Zenith at a flea market because it is the same as one I had ripped off in 'Nam back in 1967. The radio was dirty inside and out, but thanks to a repairman in a can, Formula 409 and Armorall, it not only looks great, but pulls like a champ. I have been able to listen to all the powerhouse stations as well as a group of not so powerful stations.



I bought *WRTH* and *Passport to World Band Radio*, both excellent publications, but it was just this past week I found *MT* on sale and bought the April through July issues. What a marvelous magazine -- so much information it takes a couple of days to read and digest each issue! Using the frequency guide and guide to shortwave listening I have had a grand time listening to the world.

An example of the value of the guide was in listening to the RFI recently the signal was the pits. Using the guide I tuned from 11955 to 11670 where the signal was strong as any local.

Needless to say I have subscribed and look forward to each issue. Am also considering buying something newer than the Zenith just to get more bells, whistles and frequency choices.

Shortwave Broadcasting

Broadcast Loggings

Let other readers know what you're enjoying.

*Send your loggings to **Gayle Van Horn***

160 Lester Drive, Orange Park, FL 32073

English broadcast unless otherwise indicated.

0045 UTC on 11715

Spain: Radio Beijing relay. Feature Culture in China on the Yangtze River boatmen. (Bob Fraser, Cohasset, MA)

0105 UTC on 11805

Brazil: Radio Globo. Portuguese. The crowd goes wild -- in Portuguese! Radio Globo presents a lively comedy show before an exuberant audience. (David Heitzinger, Dover, DE)

0114 UTC on 15190

Brazil: Radio Inconfidencia. Portuguese. Station ID with popular Brazilian tunes. (David Heitzinger, Dover, DE)

0129 UTC on 17765

Mexico: Radio Mexico International. Spanish. Latin pops, station promotional ID as, "en todo el mundo Radio Mexico XERMEX." Signal fading observed. (Guy Atkins, Issaquah, WA)

0200 UTC on 4830

Venezuela: Radio Tachira. Spanish. Venezuelan music with station ID at 0215 UTC as, "Radio Tachira." (Frank Mierzewski, Mt. Penn, PA)

0211 UTC on 5889

Clandestine: Radio Liberacion. Spanish. You've read about it in the papers. It's Radio Liberacion, the Contra station. And it broadcasts political commentary on Central America and Spanish music selections. (David Heitzinger, Dover, DE)

0215 UTC on 11745

Brazil: Radio Nacional-Brasilia. Feature on the 1960s with discussion on the drug culture, marriage, and music. (David Kammler, Ridgecrest, CA)

0230 UTC on 9635

Finland: Radio Finland. Fair to good signal with magazine show. Heard on parallel frequency 11755 kHz with 0255 UTC sign-off. (Richard Albright, Merced, CA)

0235 UTC on 15115

Pakistan: Radio Pakistan. Lady announcer reads slow speed English news. Extremely weak during closing announcements and station schedule. Sign-off 0245 UTC. (Rod Pearson, St. Augustine, FL)

0236 UTC on 4770

Venezuela: Radio Mundial Bolivar. Spanish. Local commercials and station promotionals with Spanish pop music. (David Heitzinger, Dover, DE)

0239 UTC on 9705

Portugal: Radio Portugal. An in-depth discussion of Portugal's folk music. (Harold Frodge, Midland, MI)

0250 UTC on 15084

Iran: Voice of the Islamic Republic of Iran. Farsi. Station ID at tune-in with presumed news topics of the Middle East. Persian music with poor audio level. (Craig Hirsh, New Orleans, LA)

0255 UTC on 4870

Ecuador: Radio Rio Amazonas. Spanish. Beautiful Ecuadorian ballads to station ID and 0300 sign-off. (Rod Pearson, St. Augustine, FL)

0258 UTC on 5045

Brazil: Radio Cultura do Para. Portuguese. Station ID and frequency at 0300, spoken in broken English. Brazilian music monitored past 0304 UTC. (Frank Mierzewski, Mt. Penn, PA)

0305 UTC on 15170

Tahiti: RFO. French. National news of France, Tahiti, and New Caledonia. Station ID with marvelous Tahitian music. Terrific conditions and audible next evening by 0145 UTC. (Larry Van Horn, Orange Park, FL)

0310 UTC on 4790

Peru: Radio Atlantida. Spanish. Peruvian ballads and several Atlantida promotionals with city location. Time check and announcer chat.

0327 UTC on 3395

Ecuador: Radio Zaracay. Spanish. Musical Coca Cola commercial and tonight's upcoming program notes. Spanish and American pop tunes. (Rod Pearson, St. Augustine, FL)

0345 UTC on 4780

Colombia: Radio Super. Spanish. "Super" ID with brassy Columbian music.

Continued Super promotions between each selection. (Michael Houghton, Boston, MA)

0350 UTC on 4934

Kenya: Voice of Kenya. (tentative) Weak but fairly audible African music. News reporting format at 0400 UTC and occasional bits of English heard.

0410 UTC on 17630

Israel: Kol Israel. U.S. sports report followed by frequency schedule and time tips. French programming begins at 0414 UTC. Heard also on parallel frequencies 12080, 9435, and 9010 kHz. (Larry Van Horn, Orange Park, FL)

0417 UTC on 4800

Lesotho: Radio Lesotho. Lesotho. Old-time gospel chorus with religious inspirational message. (Michael Houghton, Boston, MA)

0428 UTC on 4920

Ecuador: Radio Quito. Spanish. Lovely harp music with ID as, "Radio Quito, La Voz de la Capital." (Guy Atkins, Issaquah, WA)

0435 UTC on 4904

Chad: Radio Nationale Tchadienne. French. Good morning, Chad! The rooster crows and a male announcer offers a "National" ID and goooooo morning greetings. Then into African and French pop music.

0435 UTC on 4880

South Africa: Radio Five. Evening disc jockey conducts "win-a-record" contest. Rock music from Dire Straits at 0439 UTC and "Radio Five" ID. (Guy Atkins, Issaquah, WA)

0510 UTC on 11685

Saudi Arabia: Broadcasting Service of the Kingdom of Saudi Arabia. Turkish. Male announcer with news script. Audible on parallel frequency 15060 kHz. Station feature a presentation and Turkish folk music.

0531 UTC on 4915

Ghana: Ghana Broadcast Corp. African vernaculars. Native African and gospel music. English national news with ID at 0600 UTC. Items of Ghana covered were technology developments, industry projects, and UNICEF's continuing work in villages.

0535 UTC on 5020

Niger: La Voix du Sahel. French. Koran recitations and native African music. Station ID and several mentions of Niamey, followed by African flute music. News report at 0600. (Larry Van Horn, Orange Park, FL)

0600 UTC on 7265

Germany-FRG: Sudwestfunk. German. National news of Germany and weather forecast report. (David Heitzinger, Dover, DE)

0604 UTC on 6100

Nicaragua: La Voz de Nicaragua. Discussion on the U.S. Contra aid package and station ID. (David Kammler, Ridgecrest, CA)

0650 UTC on 15335

Romania: Radio Bucharest. Newscast with station ID and request for reception reports. 0715 sign-off. (Ronald Van Campen, Curacao, Netherlands Antilles)

0855 UTC on 4945

Colombia: Caracol Neiva. Spanish. Newscaster discusses national news of Colombia and El Salvador. (John Smitherman, Gainesville, FL)

0930 UTC on 4796

Bolivia: Radio Nueva America. Spanish. Fair signal and barely audible Bolivian Folk Ballads to 9030 UTC ID. (Rod Pearson, St. Augustine, FL)

0948 UTC on 5020

Solomon Islands: Solomon Islands Broadcasting Corp. Sacred choral music and religious message to 1009 UTC newscast. (Harold Frodge, Midland, MI)

0952 UTC on 4920

Australia: VLM4-Brisbane. Oldies from the 40-50s music era and 1000 UTC news report. (Harold Frodge, Midland, MI)

0952 UTC on 5030

Peru: Radio Los Andes. Spanish. Andean musical variety with ID and a commercial break at 1005 UTC. (Harold Frodge, Midland, MI)

1000 UTC on 11900

Mariana Islands-Saipan: KYOI. News service covering Fiji and the Philippines. ID at 1005 and capsule report on Algeria and Israel. (Leslie Edwards, Doylestown, PA)

1004 UTC on 4890

Papua New Guinea: NBC-Port Moresby. Announcer chat about current pop music with selections of rock oldies, pop, and country and western. (Harold Frodge, Midland, MI)

1010 UTC on 6070

Canada: CFRX-Toronto. Classical music program with "CFRX" ID (Harold

Shortwave Broadcasting

- Frodge, Midland, MI)
- 1027 UTC on 3325**
Guatemala: Radio Maya de Barillas. Spanish. "Buenas días" greeting to listeners in Central America and Mexico. Station ID and Spanish guitar duet.
- 1028 UTC on 5055**
Ecuador: Radio Católica Nacional. Spanish. Opening interval signal with "Esta es Radio Nacional de Ecuador transmitiendo desde Quito." Station frequencies, national anthem, and religious service open programming.-ed.
- 1037 UTC on 3385**
Papua New Guinea: Radio East New Britain. Pidgin. "Island" music to 1040 UTC. Announcer with local Rabaul time check and 50s rock 'n roll oldies. One more time check and country and western music from group Alabama.
- 1050 UTC on 4990**
Peru: Radio Ancash. Spanish. Announcer reads local announcements and news items. Peruvian music and station ID. Excessive noise making signal audible until only 1102 UTC. (Larry Van Horn, Orange Park, FL)
- 1100 UTC on 4865**
Colombia: La Voz del Cinaruco. Spanish. News bits and musical commercials. Time check and 1105 UTC ID. Lovely Spanish ballads and pop Spanish tunes. (Rod Pearson, St. Augustine, FL)
- 1100 UTC on 15435**
French Guiana: Radio France International relay. French. Newscast to 1120 UTC, and pop vocal music. Spanish programming at 1130. Listed English schedule of 1115-1130 not heard. (Bob Fraser, Cohasset, MA)
- 1130 UTC on 15320**
Austria: Radio Austria International. Profile program on Austrian painter of modern landscape etchings. (Bob Fraser, Cohasset, MA)
- 1130 UTC on 6120**
Canada: Radio Japan relay. Interesting feature on Japanese story tellers. (Bob Fraser, Cohasset, MA)
- 1200 UTC on 12015**
Mongolia: Radio Ulan Bator. (tentative) Sign-on with program schedule and Asian news to 1215 UTC. Chinese music to 1228 sign-off. ID not heard. (Harold Frodger, Midland, MI)
- 1203 UTC on 11800**
Australia: Radio Australia. International Report with comprehensive editorial on Laos. (Harold Frodger, Midland, MI)
- 1208 UTC on 11865**
Indonesia: Radio Republik Indonesia-Jakarta. News relay from the Jakarta headquarters. News also heard on parallel frequencies of 4753 (RRI Ujung Pandang), 4607 (RRI Serui), 3215 (RRI Manado), and presumed RRI Ternate on 3345 kHz. (Bruce MacGibbon, Gresham, OR) Look for a primer on Indonesian DX this fall in Monitoring Times. -ed.
- 1220 UTC on 9625**
Canada: Radio Canada International. Discussion on the Lobster Treaty with the United States. Parallel frequency 11740 kHz fair. (Lance Micklus, Essex Junction, VT)
- 1256 UTC on 3905**
Papua New Guinea: Radio New Ireland. Pidgin. Very nice Melanesian music with New Ireland announcements. Five musical tones at 1300 with station ID and children's musical chorus. (Guy Atkins, Issaquah, WA)
- 1258 UTC on 4719**
Indonesia: Radio Republik Indonesia-Ujung Pandang. Indonesian. Musical interval signal, "Song of the Coconut Islands," and brief station break. Five time-tips at 1300 UTC. RRI news promotional as, "Berita-berita ekonomi dan industri." (News, economic, and industry news) Super signal! (Guy Atkins, Issaquah, WA)
- 1338 UTC on 15010**
Vietnam: Voice of Vietnam. Station editorial to 1348 UTC followed by piano and Vietnamese musical vocals. (Harold Frodger, Midland, MI)
- 1500 UTC on 17575**
Madagascar: Radio Netherlands relay. Program features on horticulture and astronomy. (Ronald Van Campen, Curacao, Netherlands Antilles)
- 1504 UTC on 17870**
Vatican City: Vatican Radio. Commentary and interview on the world Food Aid project. Sign-off with ID and interval signal at 1510 UTC. Heard on parallel 15090 kHz. (Rod Pearson, St. Augustine, FL)
- 1530 UTC on 17620**
France: Radio France International. Musical program of French pop and easy-listening tunes. (Bob Fraser, Cohasset, MA)
- 1537 UTC on 21590**
South Africa: Radio RSA. Station ID followed by a discussion on the rhinoceros population of Africa. (David Heitzinger, Dover, DE)
- 1600 UTC on 17865**
United Arab Emirates: UAE Radio Dubai. Dramatic feature on Zionism. Pop music, news, and weather with 1640 sign-off. (Richard Albright, Merced, CA) Also heard on 15435 kHz at 0345. ID and national anthem sign-off at 0355. --ed.
- 1635 UTC on 9820**
Guam: KTWB-Trans World Radio. Christian music with station ID and 1637 UTC sign-off. (David Kammler, Ridgecrest, CA)
- 1812 UTC on 13715**
Czechoslovakia: Radio Prague. Light pop music and program schedule. Feature on the Czech recording industry. (Harold Frodger, Midland, MI)
- 1847 UTC on 17845**
Spain: Radio Exterior España. Spanish. IDs and easy-listening Spanish tunes at 1900 UTC. Fanfare and 1901 sign-off. (Guy Atkins, Issaquah, WA)
- 1945 UTC on 11665**
Kuwait: Radio Kuwait. Feature Studies in a Mosque on the duties of a pilgrimage. (Bob Fraser, Cohasset, MA) Monitored also from 0340-0400 UTC on 15345 and 15495 kHz. --ed.
- 2050 UTC on 15095**
Syria: Radio Damascus. English news and station identification. Moslem music with program schedule announcement for English service. (Lance Micklus, Essex Junction, VT)
- 2117 UTC on 11830**
Liberia: ELWA. Gospel choir music and religious sermon. Broadcast noted under WYFR religious station. Station ID at 2130 with ID and mention of Monrovia, Liberia. Fair signal and continued mixing with WYFR. (Joe Blakey, El Paso, TX)
- 2128 UTC on 9770**
Iraq: Radio Baghdad. Middle Eastern music to 2131 station ID. Rock music of Cindy Lauper and Starship. (Joe Blakey, El Paso, TX)
- 2130 UTC on 9620**
Yugoslavia: Radio Yugoslavia. French. International newscast and station identification. Italian news and ID at 2145 UTC. (Ronald Van Campen, Curacao, Netherlands Antilles)
- 2133 UTC on 9700**
Bulgaria: Radio Sofia. News stories on Russian cosmonauts, US/USSR INF Arms Treaty, and Afghanistan. Station ID and commentary on nuclear weapons. (Michael Houghton, Boston, MA)
- 2157 UTC on 9552**
Equatorial Guinea: Radio Nacional-Malabo. Religious programming and gospel music. ID at 2200 with Malabo and California address. National anthem and 2201 sign-off. (Harold Frodger, Midland, MI)
- 2200 UTC on 13645**
Lithuanian SSR: Radio Vilnius. Program features with news and music in English. Station sign-off at 2230 UTC. (Richard Albright, Merced, CA)
- 2212 UTC on 11620**
India: Air India Radio-New Delhi. Report on India's trade policy with the Federal Republic of Germany. (David Heitzinger, Dover, DE)
- 2235 UTC on 9735**
Paraguay: Radio Nacional. Spanish. Paraguayan folk music and station promotional. (Ronald Van Campen, Curacao, Netherlands Antilles)
- 2238 UTC on 15415**
Libya: Radio Jamahiriya. Arabic. Fervent speech followed by Arabic music. Poor signal on parallel frequency 15450 kHz. Both frequencies monitored to 0030 UTC. (Guy Atkins, Issaquah, WA)
- 2248 UTC on 6015**
Cote d'Ivoire: RDTV Ivoirienne. French. Numerous "Cote d'Ivoire" IDs with musical variety of U.S. soul, African hi-life and Spanish tropicals. (Harold Frodger, Midland, MI) (also audible on 11900 kHz during 2130-0000 sign-off.-ed.)
- 2300 UTC on 9445**
Turkey: Voice of Turkey. Turkish. Station sign-on with news and Turkish folk music. English programming began at 0300 UTC with news, program features, and pop music. Station sign-off at 0400. 9445 kHz is a new frequency from former 9560 kHz. (Dave Larson, Harlingen, TX)
- 2330 UTC on 9915**
United Kingdom: BBC. Music feature Concert Hall with Brahms' 4th Symphony. Heard on parallel frequencies 5975, 6175, 7325, and 9590 kHz. (Bob Fraser, Cohasset, MA)

Utility World

Larry Van Horn
160 Lester Drive
Orange Park, FL 32073

Better Reception = More to Hear

As this column is being written, sunspot numbers continue to rise. It has now risen high enough to make the 20 meter (14000-14350 kHz) amateur band a 24-hour a day DXer's delight. The increasing sunspot numbers are also responsible for the skip conditions on frequencies above 30 MHz almost on a daily basis.

There are a lot of utility frequencies that have been dormant since the last sunspot cycle peak. These frequencies are now coming alive with activity. As the sunspot numbers continue to climb to a peak sometime between 1989-1993, more and more utility stations will move higher in frequency to avoid the congestion on lower bands.

Now what is all this talk about sunspot numbers, you ask, and what does it mean for me?

For years astronomers have observed darkened areas on the surface of the sun. These darkened areas, called sunspots, have been observed to increase and decrease in numbers on an approximate eleven year cycle. With the advent of radio, it was observed that higher frequencies tended to propagate when the sunspot numbers approached maximum. Thus the assumption, the higher the number of observed sunspots, the higher the maximum useable frequency will be for worldwide radio communication.

Cycle 21: Where We Have Been

The last sunspot cycle, cycle 21, started in June 1976 with a smooth sunspot count of 12. After the minimum, the numbers rose quickly, reaching a maximum of 165 in December 1979. From then on the numbers slowly decreased until the minimum was reached in September 1986. The smooth number at this point reached 12.4. Since then the count has started to rise, and at this point in time we are well into cycle 22.

Cycle 22: Where Are We Headed?

Currently there are many predictions for cycle 22 maximum that range from 20 to 200. As to when this takes place, at this stage it could be between 1989-1993. Based on recent developments, 1989-1990 might be more realistic. Smooth numbers around 75 could be occurring by the time you read this.

There is a tradeoff, however. Higher numbers and frequencies also mean more solar disturbances that disrupt shortwave communications. Solar flares will increase, which cause shortwave frequencies to completely fade out. Also more disappearing filaments and coronal holes from the face of the sun mean more geomagnetic storms.

These can all play havoc with shortwave propagation for many days at a time. Over the past year, we have seen a steady increase in geomagnetic activity and solar flares.

It has been about eight years since the higher frequencies were really active. Since most have not listened to the higher bands for some time, Table 1 has been prepared to acquaint newcomers and old-timers alike to the frequency spectrum above 18 MHz.

U.S. Navy Frequencies

The most active and frequent user of the shortwave spectrum is our own U.S. Navy. While fleet communication satellites have reduced the navy's dependence on HF frequencies over the last several years, the navy still conducts a lot of its operations on shortwave.

Table 2 lists some of the more active channels for navy communications. A lot of work still needs to be done on active channels and usages of these channels. MT readers are invited to send in any information you might have on navy HF activity.

Table 1
Shortwave Band Plan Above 18 MHz

17900.0-17970.0	Aeronautical Mobile (civilian)
17970.0-18030.0	Aeronautical Mobile (military)
18030.0-18068.0	Fixed Service
18068.0-18168.0	Amateur Radio/Fixed Service (shared)
18168.0-18780.0	Fixed Service
18780.0-18900.0	Maritime Mobile/Fixed Service (shared)
18900.0-19680.0	Fixed Service
19680.0-19800.0	Maritime Mobile/Fixed Service (shared)
19800.0-19990.0	Fixed Service
19990.0-20010.0	Standard Frequency, Time Signals and Space Research
20010.0-21000.0	Fixed Service
21000.0-21450.0	Amateur Radio
21450.0-21750.0	International Broadcasting
21750.0-21850.0	International Broadcasting/Fixed Service (shared)
21850.0-21870.0	Fixed Service
21870.0-21924.0	Aeronautical Fixed
21924.0-22000.0	Aeronautical Mobile (civilian)
22000.0-22120.9	Maritime Mobile: Ship Voice Duplex (USB)
22121.0-22139.0	Maritime Mobile: Coast/Ship Simplex
22139.5-22192.0	Maritime Mobile: Ship FAX, Data, Etc.
22192.5-22225.5	Maritime Mobile: Ship RTTY Duplex
22227.0-22247.0	Maritime Mobile: Ship CW Calling
22250.5-22310.0	Maritime Mobile: Ship CW Working
22310.0-22561.0	Maritime Mobile: Coast CW Calling/Working
22561.5-22594.5	Maritime Mobile: Coast RTTY Duplex
22596.0-22716.9	Maritime Mobile: Coast Voice Duplex (USB)
22720.0-22855.0	Maritime Mobile/Fixed Service (shared)
22855.0-23200.0	Fixed Service
23200.0-23350.0	Aeronautical Mobile (military)
23350.0-24000.0	Fixed Service
24000.0-24890.0	Fixed Service/Land Mobile
24890.0-24990.0	Amateur Radio
24990.0-25010.0	Standard Frequency, Time Signals and Space Research
25010.0-25070.0	Fixed/Mobile Service
25070.0-25110.0	Maritime Mobile
25110.0-25210.0	Maritime Mobile/Fixed Service (shared)
25210.0-25550.0	Fixed/Mobile Service
25550.0-25670.0	Radio Astronomy
25670.0-26100.0	International Broadcasting
26100.0-26175.0	Maritime Mobile/Fixed Service (shared)
26175.0-27500.0	Fixed/Mobile Service
27500.0-28000.0	Fixed/Mobile Service/Meteorological Aids (shared)
28000.0-29700.0	Amateur Radio
29700.0-30000.0	Fixed/Mobile Service

Table 2
Active U.S. Navy HF Voice Freqs

3095, 3265, 4040, 4373, 4376.5, 4400.8, 4416, 4422, 4711, 4737, 4813.5, 5071, 5080, 5718, 5783.5, 6686, 6697, 6701, 6720, 6723, 6746, 6833.5, 6968.5, 7498.6, 7507, 7593.5, 7963.5, 7968.2, 8972, 9002, 9032, 9036, 11191, 11194, 11195, 11198, 11201, 11258, 11267, 12003.5, 12058.5, 13110.1, 13172.1, 13181.0, 13182.8, 13231.0, 13251.0, 13529.0, 15022.5, 18087.5, 23281.0, 23284.0, 23298.0, 23312.0

One of the easier ways to recognize navy activity is by the distinctive tactical callsigns that navy units use. These tac calls consist of three alphanumeric characters (Bravo Niner Quebec, Alpha Six Juliett, etc). These tactical calls are changed daily from a large pool of available callsigns.

Several *Monitoring Times* readers have written to ask if there is a reference source for identifying navy stations of the Bravo Niner Quebec-type heard on HF. The intent of the navy in using these

Table 3
U.S. Navy MARS Afloat

4007.0, 4013.5, 4041.0, 4470.5, 4818.5, 5158.0, 7300.0, 7358.8, 7363.5, 7368.5, 7391.5, 7493.5, 7684.0, 8031.5, 11538.0, 11653.5, 12047.5, 12122.5, 13378.5, 13483.5, 13528.5, 13538.5, 13643.0, 13826.0, 13974.0, 14383.5, 14670.0, 14470.0, 14477.0, 14483.5, 14818.5, 14838.5, 14934.0, 16298.5, 16386.0, 19186.0, 20678.5, 20936.0, 20987.0, 20997.0, 27962.0, 27974.0

types of callsigns is to deny the enemy knowledge of what unit he is listening to. All reference information on these callsigns is classified and publications relating to these tactical callsigns are not available in the public domain.

Going Green

Navy units use primarily USB mode. Listeners will occasionally hear references to navy units "going green." This means that they are turning on sophisticated voice scramblers to defeat monitoring. You will then hear either the scrambled voice or noise depending which type of scrambling device is being used. Stations that are heard in the clear are "in the red" meaning they are not scrambling communications.

Navy users that can be heard on shortwave fall into three main categories. These are fleet communication stations (COMSTA), anti-submarine warfare patrol and command aircraft, and of course, ships. All will be heard using the aforementioned three character callsigns. Basically, if you hear these three character callsigns in use, you are tuned into a navy tactical communication frequency.

Another way to hear navy ships and yes, verify them, is to listen to navy MARS Afloat channels. The MARS (Military Affiliate Radio System) uses licensed amateur radio operators to communicate with ships and help pass routine moral traffic ashore. The *Grove Shortwave Frequency Directory* has a comprehensive list of navy MARS callsigns that can aid the monitor in determining which ship is being monitored.

A good frequency to check for activity is the Afloat calling frequency of 14441.5. Ships can be heard checking in on this frequency, then moving to other designated channels to conduct business with the shore station they contact.

All Navy MARS voice activity can be heard using USB mode of transmission and are simplex. Other Navy Afloat MARS channels to monitor are included in Table 3.

Finally, another set of navy channels to monitor that will yield some nontactical communication are the Harbor/Shipyards common channels. As ships pull into and out of port, a HF frequency is used to communicate with a harbor operations center. Most of the ships heard on these channels use the ship's name (USS Forrestal, etc). The base operations center will use the name of the base plus the word "Control" (Mayport Control, Long Beach Shipyard Control, etc.). These transmissions normally use USB mode and are simplex. USN/Shipyards frequencies include: 2150, 2434, 2716, and 2836 kHz, with 2716 being the most actively utilized on both coasts.

UTILITY REFERENCES

An excellent source of utility station information that no utility listener should be without is the *Guide to Utility Stations* published annually by Joerg Klingenfuss. Joerg's latest edition of this popular by-frequency directory is now in its sixth edition.

The *Guide* contains over 15,802 frequencies which the author personally monitored during 1987. There are additional sections of this book that cover RTTY schedules, FAX schedules, station addresses, ITU HF regulations and many other important sections of useful utility information, charts and maps.

In addition to the forementioned book, Mr. Klingenfuss publishes several other reference guides of use to the utility monitor. Some of these titles from his latest catalog include:

Radioteletype Code Manual, 10th edition -- released December 1987
Magnetic Tape Recording of Modulation Types, 4th edition -- released April 1983

Guide to Facsimile Stations, 7th edition -- released May 1987

Guide to Former Utility Stations, 3rd edition -- released May 1987

Air and Météo Code Manual, 9th edition -- released December 1986

Joerg has a brochure available giving detail listings of all his utility publications. You can get this brochure by writing the following address: Klingenfuss Publications, Hagenloher Str. 14, D-7400 Tuebingen, Federal Republic of Germany. Be sure to tell Joerg that you saw it in *MT's Utility World* when you write.

From the Mailbag

Richard Albright reports the mystery is over. Utility Station 7TF which has caused considerable head scratching in the various SWL publications has been identified. The station is Boufakir Radio in Algeria, according to a response from the Algerian Ministry of Posts and Telecommunications.

Boufakir Radio is located at 36N12, 02E43 and runs 10KW of power. The station uses a monocone antenna. Rich has received a prepared card verification from 7TF.

Rich mentions that he has been monitoring utility stations since the 1950s, but the recent availability of frequency and address lists coupled with his recent purchase of a Sony ICF-2010 has renewed his interest.

"I've had 64 verifications to a flurry of reception reports that began over a year ago. Generally Asia/Pacific and Western Europe seem to respond the most, Latin America the least." Rich's choice for best-looking utility verification is a toss-up between JBO-Japan, HEB-Switzerland, and Britain's GKA.

He also included several U.S. Navy MARS callsigns that he could not identify that are included below (hope the IDs help):

NNNOCCE --	Dept. of Commerce ship (name unknown)
NNNOCAC --	USS Mobile Bay
NNNOCAL --	USS Antietam
NNNOCHG --	USS Gary
NNNOCHS --	USS Vincennes

Readers are reminded that a comprehensive list of U.S. Navy MARS callsigns Afloat and Ashore appears in the *Grove Shortwave Directory*. This is available from the folks who publish *MT*. No self-respecting utility listener should be without this valuable reference.

Rich could also use some help identifying the following USAF callsigns: Ironweed, Pep Rally, Fall Fish, Doorknob, Mince Pie, Biometro, Old Salt, Center, or Monarchy? From the looks of the list, Rich, these are probably tac calls that change from time to time making identification of the user difficult. If anybody can help on these, drop me a note.

Logging Column Ground Rules

I really don't have many of these, but certain items must be included with your loggings. Date, time, frequency (let me know if approximate), callsign (if known), location (if known), and especially if you designate the log as an unknown, some details to work with will help in trying to identify your intercept.

I use UTC/kilohertz for time and frequency. If it is a number station log please include the day of the week-UTC with your logging.

If you want a personal reply please be patient and include a SASE. I am always willing to try to answer questions and will accept frequency lists and other goodies to share with our *MT* readers. I will also accept utility verifications that readers send in. Do not send the originals, clear xerox copies are just fine.

And now on with this month's loggings from the *Utility World*.

Utility Loggings

Abbreviations used in this column

All times UTC, frequencies in kilohertz. All voice transmissions are English unless otherwise noted.

AM	Amplitude Modulation	ISB	Independent Sideband
ARQ	Sitor	LSB	Lower Sideband
CW	Morse Code	RTTY	Radioteletype
FAX	Facsimile	UNID	Unidentified
FEC	Forward Error Correction	USB	Upper Sideband
ID	Identification		

- 1632.0 Monitored random beeps on this frequency around 0439. (Lance Micklus, Essex Junction, VT) This is a Canadian Cubic Argo Radiolocation frequency. Welcome back to the column, Lance. -ed.
- 1721.5-1725.0 Monitored a beacon that sounded like it was sending the letter "N" in CW. 1721.5 seemed to be sync'd with 1725.0. Heard at 0448. (Lance Micklus, Essex Junction, VT) While I do not have a specific listing, this is probably some sort of radiolocation beacon. -ed.
- 1746.8 Beacon type signal heard at 0456. Seemed to be sync'd with another weaker signal. (Lance Micklus, Essex Junction, VT) This is another Canadian Cubic Argo Radiolocation channel. -ed.
- 2598.0 Unknown station giving marine weather in USB at 0518 for the Gulf regions. Station off by 0523. (Lance Micklus, Essex Junction, VT) This is a Canadian Coast Guard channel. Could be a number of stations that operate on the frequency. -ed.
- 3225.0 Female Spanish numbers station heard at 0340. (David Heitzinger, Dover, DE) Welcome back to the column, David. -ed.
- 3413.0 Shannon Volmet heard in USB at 0330. The station repeatedly IDed as "Shannon Volmet." Continuous weather conditions such as visibility, runway visibility, temperatures, etc. was given for several airports in Europe. These included Cologne, Bonn, Amsterdam, Manchester, and London's Heathrow. (Gayle Van Horn, Orange Park, FL)
- 3564.0 781JU-Heard Foxes, Yr's, ID then sign off at 0542. This was an RTTY signal. (Lance Micklus, Essex Junction, VT) This is probably the Spanish Naval Radio at Rota, Spain. They crop up all over the band using these NATO identifiers. -ed.
- 4125.0 Ohio River boat traffic monitored around 0126 using USB. (Harold Frodge, Midland, MI) Welcome back, Harold. This is a common coast/ship simplex channel. -ed.
- 4428.7 NMN-U.S. Coast Guard Portsmouth, Virginia, heard at 0400 in USB. Station using a computer generated voice giving weather information for the eastern seaboard marine areas. (Gayle Van Horn, Orange Park, FL)
- 4470.0 Female Spanish numbers station heard at 0337. (David Heitzinger, Dover, DE)
- 4722.0 MVU-West Drayton Volmet, England, heard at 0042 in USB. (Harold Frodge, Midland, MI) Heard at 0410 in USB. (Gayle Van Horn, Orange Park, FL)
- 4725.0 "Artic Fox" heard at 0117 in USB. Male operator sending alpha-numeric characters. (Harold Frodge, Midland, MI) This is SAC channel "Quebec." Harold. Probably an airborne command post. -ed.
- 5190.0 Cape Radio working Celestial requesting a radio check at 0325 in USB. Cape Radio asked Celestial to contact "Raymond" with negative results. Celestial then tried to contact "Ramrod." Cape Radio said not available until 0415. There was reference to a Soviet freighter after the radio check. (Al Rayment, Nelson, BC, Canada) Interesting. Al. Thanks for the logging, please report often. -ed.
- 5547.0 Aeroradio ATC-San Francisco, California, working Echo Foxtrot Charlie. Aircraft gave ETA to Honolulu and number of passengers on board in USB at 0225. (Trevor Stanley, Flagstaff, AZ) Welcome back to the column, Trevor. -ed.
- 5550.0 Aeroradio ATC-New York, New York, working Cubana 474. Aircraft gave a position/altitude report at 0225 in USB. (Trevor Stanley, Flagstaff, AZ)
- 5598.0 Aeroradio ATC-Gander, Newfoundland, working Iberia 954 at 0230 in USB. Aircraft gave a position report and requested a change of altitude. (Trevor Stanley, Flagstaff, AZ)
- 5616.0 Aeroradio ATC-New York, New York, working TWA 900 in USB at 0257. Aircraft gave position/altitude report. (Trevor Stanley, Flagstaff, AZ)
- 5696.0 NMN-USCG COMSTA Portsmouth, Virginia, conducting a radio check with CG aircraft 1494 at 0245 in USB. (Trevor Stanley, Flagstaff, AZ)
- 6200.0 NMC-USCG COMSTA San Francisco, California, working the coast guard cutter "Fort Point" with a radio check at 0130 in USB. (Trevor Stanley, Flagstaff, AZ)
- 6326.5 WNU-Slidell Radio, Louisiana, heard at 1224 with a CQ CW marker.
- 6376.0 WCC-Chatham Radio, Massachusetts at 1235 with a V CW marker.
- 6386.5 HKC-Buenaventura Radio, Colombia, with a CQ CW marker at 1239. Heard interference from a navy link 11 datalink transmitter.
- 6389.7 WNU42-Slidell Radio, Louisiana, with a CQ CW marker at 1240.
- 6428.5 VIX-Royal Australian Navy, Canberra, heard at 1246 with a V CW marker.
- 6436.8 ZLO-Royal New Zealand Navy, Waiouru, with a AR DE CW marker at 1249.
- 6491.5 JOS-Nagasaki Radio, Japan, heard at 1300 with a CQ CW marker.
- 6497.0 VIP-Perth Radio, Australia, at 1304 with an ARQ idler and callsign only CW marker.
- 6499.0 WLO-Mobile Radio, Alabama, heard with a DE CW marker and ARQ idler at 1306.
- 6499.5 WLO-Mobile Radio, Alabama, at 1307 sending a DE CW marker and ARQ idler.

- 6501.0 VIS-Sidney Radio, Australia, heard sending a callsign only CW marker and ARQ idler at 1309.
- 6501.5 WLO-Mobile Radio, Alabama, heard at 1310 with a DE CW marker and ARQ idler.
- 6577.0 Aeroradio ATC-New York, New York, working Speedbird 292 (flight from Miami to Heathrow Airport, London). New York assigned primary frequency as 5550 and flight level of 33,000 feet. Heard at 0230 in USB. (Trevor Stanley, Flagstaff, AZ)
- 6715.0 SAM 27000 working Andrews AFB. (Mark Holmes, College Park, GA) No time and mode given. Please report often, Mark, and welcome to Utility World. -ed.
- 6750.0 USAF Lajes AB, Azores, heard in USB at 0253. There was an emergency but I missed it by a few minutes. The operator cancelled the emergency and advised all to resume normal traffic. (David Heitzinger, Dover, DE)
- 6784.0 English male 3/2 digit number station heard at 0114 with a weak signal. (Harold Frodge, Midland, MI)
- 6812.0 Air Force Two working Andrews AFB. (Mark Holmes, College Park, GA)
- 7889.0 Female Spanish numbers station heard at 0612. (David Heitzinger, Dover, DE)
- 8291.0 Exxon Jamestown working KHT-Cedar Rapids, Iowa, in USB at 1858. (Richard Albright, Merced, CA) Welcome back to the column, Richard. -ed.
- 8438.0 9WH-Kota Kin Radio, Sabah, Malaysia heard at 1151 with a CQ CW marker.
- 8444.5 KFS-San Francisco Radio, California, at 1203 with a CQ CW marker.
- 8465.0 NMN-U.S. Coast Guard Portsmouth, Virginia, with a CQ CW marker then ship traffic.
- 8478.5 FUF-French Naval Radio Fort de France, Martinique, with a V CW marker at 1210.
- 8525.0 WNU-Slidell Radio, Louisiana, heard with a CQ CW marker at 0945. (Lance Micklus, Essex Junction, VT)
- 8843.0 Aeroradio ATC-San Francisco, California, working American 10. Aircraft gave fuel on board, outside air temperature and ETA to San Francisco at 0225 in USB. (Trevor Stanley, Flagstaff, AZ)
- 8846.0 American 699 working New York Aeroradio on USB at 1402 declaring an emergency. At 1407 the flight advised he was losing fuel rapidly due to a massive leak in engine #2. The pilot stated that his aircraft type was an A300 with 103 souls on board and that his ETA for Bermuda was 1451. At 1413 he advised shutting down of #2 engine and told to contact Bermuda on VHF-128.5. No further comms monitored. Never heard anything on the news, so I guess the flight made Bermuda OK with leaking fuel and one engine out. (Garie Halstead, Saint Albans, WV) Just goes to show that utes can be exciting. Welcome back, Garie. -ed.
- 8864.0 Aeroradio ATC-Gander, Newfoundland, working TWA 64 in USB at 0140. Aircraft was giving a position/altitude report. (Trevor Stanley, Flagstaff, AZ)
- 8989.0 USAF GCCS MacDill AFB, Florida, working Foxtrot Charlie Echo 313. Aircraft running a phone patch with MacDill Ops giving ETA and requesting clearance to maintenance on landing MacDill. Monitored at 0120 in USB. (Trevor Stanley, Flagstaff, AZ)
- 9540.0 In USB and RTTY heard COMSTA Bravo, MB6, V5Y, B16 and some others from 1800 on in USB. Sounded like some Army Reserve units. One message was interesting: "We need sodas, lots of sodas." Also wanted phone message to "The Rear" and passed info RTTY. One transmission ended with "Roger, QSL is 2313185A88." (Ken Kuzenski, Jackson, LA) Thanks for the report, Ken Your guess is as good as mine. Please report often. -ed.
- 11200.0 MVU-West Drayton Volmet, England, with aviation weather at 0146 in USB. (Harold Frodge, Midland, MI) Heard at 0135 (Trevor Stanley, Flagstaff, AZ)
- 11246.0 USAF GCCS MacDill AFB, Florida, passing a skyking message broadcast at 0200 in USB. (Trevor Stanley, Flagstaff, AZ) Mac 50238 (C-141) working MacDill with a phone patch which included a request for 90,000 pounds of fuel at destination. (Mark Holmes, College Park, GA)
- 11396.0 Aeroradio ATC-New York, New York, working Speedbird 2 at 0000 in USB. Aircraft was requesting an altitude change. (Trevor Stanley, Flagstaff, AZ)
- 11530.0 Spanish female numbers station heard at 0104. (David Heitzinger, Dover, DE)
- 12660.0 WLO-Mobile Radio, Alabama, with a DE CW marker at 1233.
- 12695.5 KFS-San Francisco Radio, California, at 1248 with a CQ CW marker.
- 12702.0 NMR-U.S. Coast Guard COMSTA San Juan, Puerto Rico, heard with a V/CQ CW marker at 1250. Heard this 2 kHz higher than most ule lists carry them.
- 12718.5 CKN-Canadian Forces, Vancouver, BC, heard at 1311 with a DE naws CW marker, weak. Not on any list I have, possible new frequency.
- 12718.5 NMN-U.S. Coast Guard Portsmouth, Virginia, with a CQ CW marker signal at 1254.
- 12740.0 ZLB-Awarua Radio, New Zealand, heard at 1304 with a DE CW marker. Noted strong RTTY interference on the frequency.
- 12745.5 JJC-Tokyo Radio, Japan, in the FAX mode sending a wire service photo at 1319.
- 12747.5 CBV-DGTTMM Valpariso Radio, Chile, with a CQ CW marker at 1308, weak.
- 12748.5 JJC-Tokyo Radio, Japan, heard with a weak FAX signal here at 1306, slight interference monitored from an unknown station.
- 12750.0 NIK-U.S. Coast Guard Boston, heard at 1320 with a V CW marker.
- 12753.0 CKN-Canadian Forces Radio Vancouver, BC, heard at 1322 with a V CW marker.
- 12763.5 DAM-Norddeich Radio, West Germany, at 1314 with a V CW marker.
- 12768.0 PCH-Scheveningen Radio, Denmark, heard with a DE CW marker at 1315.
- 12781.5 OST-Oostende Radio, Belgium, at 1229 with a CW V marker, weak.
- 12788.0 JFA-Chuo Gyogyo (Matsudo) Radio, Japan at 1324 with a CQ CW

Utility World

- marker.
- 12818.0 SAB-Gothenburg Radio, Sweden, monitored with an ARQ idler then traffic at 1220. No CW ID noted.
- 12835.4 GKB-Portsmouth Radio, England, at 1217 with a CW DE marker. Noted heavy Russian "woodpecker" over-the-horizon radar interference.
- 12844.5 KFS-San Francisco Radio, California, monitored at 1215 with a CQ CW marker.
- 12847.0 WCC-Chatham Radio, Massachusetts, at 1214 with a CQ V marker transmission. Signal was real strong.
- 12869.0 WNU54-Slidel Radio, Louisiana, heard at 1208 with a CW CQ marker.
- 12874.0 VCS-Canadian Coast Guard Halifax, Nova Scotia, with a V/CQ CW marker at 1207.
- 12875.0 FUG-French Naval Radio La Regine, France, at 1205 in CW with a V marker. Noted heavy Russian "woodpecker" over-the-horizon radar interference.
- 12879.5 WSC-Tuckerton Radio, New Jersey, heard with a CW CQ marker at 1202.
- 12880.5 SAG-Gothenburg Radio, Sweden, monitored at 1201 with CW ship traffic.
- 12907.5 VHP-Royal Australian Navy Canberra, Australia, in at 1150 with a CW V marker transmission.
- 12909.0 Y5M-Rugen Radio, East Germany, with a CW V marker at 1152. This is a new frequency for Y5M.
- 12935.0 HLG-Seoul Radio, South Korea, with a real weak signal at 1144 sending a CQ CW marker.
- 12949.9 ZLO-Royal New Zealand Navy Waiouru, at 1142 with an AR DE marker.
- 12952.5 VIS-Sydney Radio, Australia, in strong at 1136 with a CW V marker.
- 12952.9 WMH-Baltimore Radio, Maryland, heard at 1135 with a V CW marker signal.
- 12958.5 PPO-Olinda Radio, Brazil, with a V CW marker at 1134.
- 12966.3 A7D-Doha Radio, Qatar, at 1132 with a CW DE marker, weak.
- 12970.5 PKX-Jakarta Radio, Indonesia, with a CQ CW marker at 1131.
- 12975.0 IQX-Trieste Radio, Italy, with a V CW marker at 1130. Signal was chirpy.
- 12994.0 VIP-Perth Radio, Australia, heard with a V CW marker at 1227.
- 13005.0 NMN-U.S. Coast Guard Portsmouth, Virginia, sending a RTTY message at 1345. 175 HZ shift/75 baud speed/reverse sense.
- 13008.0 JOR-Nagasaki Radio, Japan, sending high speed CQ CW marker at 1125.
- 13011.0 WNU44-Slidel Radio, Louisiana, at 1124 with a CQ CW marker, real weak.
- 13019.8 GKC-Portsmouth Radio, England, with a DE CW marker at 1122, real weak.
- 13020.4 VPS60-Victoria Island, Hong Kong, heard with a DE CW marker at 1121, weak.
- 13025.0 WLO-Mobile Radio, Alabama, at 1119 with a DE CW marker, real weak.
- 13031.2 FUF-French Naval Radio Fort de France, Martinique, at 1116 with a DE CW marker.
- 13038.0 KLC-Galveston Radio, Texas, with a CQ CW marker at 1115, real weak.
- 13054.0 JDC-Chosi Radio, Japan, heard with a high speed CQ CW marker at 1111.
- 13063.0 JDB-Nagasaki Radio, Japan, at 1109 with a high speed CQ CW marker.
- 13067.0 OST-Oostende Radio, Belgium, heard at 1108 with a V CW marker. Interference from an unknown CW station.
- 13069.5 JOS-Nagasaki Radio, Japan, heard at 1106 with a high speed CQ CW marker.
- 13072.0 GKE-Portsmouth Radio, England, at 1105 with a callsign only CW marker and ARQ idler signal.
- 13073.5 SPB-Szczecin Radio, Poland, in with a nice signal sending a callsign only CW marker and ARQ idler.
- WLO-Mobile Radio, Alabama, monitored at 0104 with an ARQ idler and callsign only CW marker. Could hear WLO under SPB's powerhouse signal.
- 13075.0 HPP-Panama Radio, Panama, with an ARQ idler and callsign only CW marker at 0108.
- 13076.0 VIP-Perth Radio, Australia, heard with a callsign only CW marker and ARQ idler at 1101.
- 13089.5 UFN-Novorossiysk Radio, USSR, at 0134 with a DE CW marker and ARQ idler.
- 13093.0 UNID CW marker as follows: "DE CQ R4" followed by a FEC transmission at 2109. (Jim Boehm, San Antonio, TX) This is probably the Russian coastal UFB-Odessa on kth channel. Welcome back to the column. -ed.
- 13095.0 KLC-Galveston Radio, Texas, monitored at 2234 with a CQ CW marker.
- 13095.5 SVB-Athens Radio, Greece, monitored at 2233 with CW callsign only then tone generated carrier.
- 13097.5 FFT64-St. Lys Radio, France, with callsign only marker at 2229.
- 13099.0 GKO-Portsmouth Radio, England, with an ARQ idler and callsign only CW marker at 2227.
- 13100.0 TIM-Limon Radio, Costa Rica, monitored at 2226 with a CW CQ marker.
- 13113.2 NMO-USCG COMSTA Honolulu, Hawaii, heard at 0345 in USB with marine weather for the Hawaiian Islands. (Trevor Stanley, Flagstaff, AZ)
- 13181.4 U.S. Navy tactical unit Whiskey 6 Zulu sending a coded message at 0230 in USB. (Trevor Stanley, Flagstaff, AZ)
- 13187.6 Cruise ship Rotterdam (at Glacier Bay, Alaska) working KMI-Point Reyes, California, in USB at 0357. (Richard Albright, Merced, CA) This is ship-to-shore channel 1229. The ship side is on 12416.8-ed.
- 13201.0 USAF GCCS McClellan AFB, California, running a phone patch with Aussie 181 in USB at 0140. Aircraft gave arrival time to Norton AFB and requesting wind speed and surface temperature at Norton. (Trevor Stanley, Flagstaff, AZ)
- 13244.0 King 52 (C-130) working MacDill AFB, Florida, with a radio check. (Mark Holmes, College Park, GA)
- 13826.0 NNNONWE-Navy MARS Guam working NNNONRI-Point Hueneme, California, in USB at 2030. NNNONVP-Midway Island working NNNONRI at 2200 and NNNOICE-McMurdo station, Antarctica, working NNNONRI at 0502, all in USB. (Richard Albright, Merced, CA)
- 14356.0 GFL24-Bracknell, England, monitored sending coded weather via RTTY at 1804. 425 HZ shift/50 baud speed/reverse sense. (Lance Micklus, Essex Junction, VT)
- 14467.0 NNNONCA-Marcus Island working NNNONRI-Point Hueneme, California, at 0315 in USB. (Richard Albright, Merced, CA)
- 14478.3 NNNONCE-Kure Island working an unknown station in USB at 2000. (Richard Albright, Merced, CA) Nice catch, Rich, wonder if these guys verify. Not much else to do on that island. I've been there. -ed.
- 14509.0 RIW-Soviet Naval Radio Khiva, USSR, sending CW coded traffic at 1810. (Lance Micklus, Essex Junction, VT)
- 16518.9 Cruise ship Sovereign of the Seas (near Puerto Rico) working WOO-Ocean Gale Radio, New Jersey, at 2030 in USB. (Richard Albright, Merced, CA)
- 16587.1 Merchant ships Columbus Virginia, German Senator and Euro Texas sharing position reports, etc. In German using USB at 21005. Ships somewhere off the west coast. Also monitored the tanker Orni Hudson (KNJL) working KHT-Cedar Rapids, Iowa, in USB at 2100. (Richard Albright, Merced, CA)
- 16590.2 Container ship Sea-Land Mariner (KGJF) working a Tacoma coastal station in USB at 1818. Ship was off the west coast. (Richard Albright, Merced, CA)
- 16932.2 WCC-Chatham Radio, Massachusetts, at 1333 with a CQ CW marker. 7TF-Boufakir Radio, Algeria, heard sending traffic then a CQ CW marker at 1334.
- 16948.5 VCS-Canadian Coast Guard Halifax, Nova Scotia, sending weather data in CW at 1338.
- 16954.4 GKC-Portsmouth Radio, England, sending a DE CW marker at 2209.
- 16960.0 Weak PW... Brazilian Naval Radio Station heard here at 2208. Couldn't quite make out the call in all the noise from a solar flare disturbance.
- 16961.0 CLA-Havana Radio, Cuba, at 1347 with a CQ CW marker.
- 16980.4 DAM-Norddeich Radio, West Germany, with V marker at 1350.
- 16181.5 SVG-Athens Radio, Greece, with a high speed CW DE marker at 1351.
- 16987.2 GYU-Royal Naval Radio Gibraltar, heard sending a DE CW marker at 2202.
- 17004.0 HKB-Barranquilla Radio, Colombia, at 1353 with a CQ CW marker. Possible new frequency.
- 17021.6 WLO4-Mobile Radio, Alabama, with a DE then CQ CW marker at 1400.
- 17024.0 SAB-Gothenburg Radio, Sweden, at 2157 with an ARQ idler and CW callsign only marker, weak.
- 17038.0 WNU-Slidel Radio, Louisiana, at 2155 with a CQ CW marker.
- 17074.4 LGX-Rogaland Radio, Norway, in at 2126 with a CQ CW marker.
- 17079.4 SAG-Gothenburg Radio, Sweden, with a CQ CW marker at 2124. Heavy RTTY interference.
- 17088.8 KPH-San Francisco Radio, California, at 1409 with a CW V marker.
- 17094.8 SVA-Athens Radio, Greece, with a DE CW marker at 2120, weak.
- 17104.2 PCH-Scheveningen Radio, Holland, heard at 1409 with a V CW marker.
- 17113.0 GKB-Portsmouth Radio, England, sending a DE CW marker at 1414.
- 17131.0 UJQ7-Kiev Radio, USSR, working 4R (7). Told ship to QSX 12 MHz. Transmission in CW at 2050. (Richard Albright, Merced, CA)
- 17132.0 ZSU6-South African Navy, Capetown, at 1423 with a CW CQ marker.
- 17137.7 GK06-Portsmouth Radio, England, with callsign only CW marker and ARQ idler at 1425.
- 17143.6 DAN-Norddeich Radio, West Germany, heard at 1427 with a CW CQ marker.
- 17170.2 UNID CW station sending the following: "K DE W2 CQ SX 8/16 MHz K" then called by an unknown station kat 1536. Answered with a brief Alpha code plus used standard "Q" codes and "OK". Duplex operation, other channel unknown. (Jim Boehm, San Antonio, TX) This is pretty much the norm, Jim. The ships can be heard on their frequencies as follows: 16707.0-16719.5 (ship working), 16720.0-16748.8 (ship calling), and 16754.0-16859.0 (ship working). -ed.
- 17172.4 9MG11-Penang Radio, Malaysia, heard with a CW CQ marker then traffic list at 1530. (Jim Boehm, San Antonio, TX)
- 17175.2 WLO-Mobile Radio, Alabama, heard at 2111 with a DE CW marker.
- 17175.2 VAI-Canadian Coast Guard Vancouver, BC, with a CW CQ marker at 1432.
- 17184.8 KFS-San Francisco Radio, California, with a CQ CW marker at 2108.
- 17194.4 PPR-Rio de Janeiro Radio, Brazil, heard with callsign at 2104, appeared to be sending some sort of traffic.
- 17198.0 SVB6-Athens Radio, Greece, at 1436 with a DE CW marker.
- 17199.5 GKC6-Portsmouth Radio, England, with an ARQ idler and CW callsign only marker at 1437.
- 17199.5 ULO-Mobile Radio, Alabama, at 1438 with a callsign CW only marker and ARQ idler.
- 17204.5 WLO-Mobile Radio, Alabama with an ARQ idler and CW callsign only marker at 1439.
- 17206.5 ZSC-Capetown Radio, South Africa, at 1441 with a DE CW marker and tone generated carrier.
- 17215.0 GKP6-Portsmouth Radio, England, sending a CW callsign only marker and ARQ idler at 1444.
- 17221.0 HEC-Berne Radio, Switzerland, sending a callsign only CW marker and ARQ idler at 1446.
- 17228.0 UAT-Moscow Radio, USSR, with an ARQ idler and callsign given several times in CW at 2016.
- 17385.0 5BC84-CTA Nicosia, Cyprus, in USB at 0400. Male operator sending a English voice marker "This is Cyprus Radio and frequency." This was followed by an ID in Greek, heard Nicosia mentioned. Parallel frequency of 16512.0 not heard. (Gayle Van Horn, Orange Park, FL)
- 22530.8 PW... Unknown Brazilian Naval Radio IStation heard at 2212 with a V/CQ CW marker. Signal real weak plus high noise level made ID impossible.

The Scanning Report

Bob Kay

104 Bonsall Avenue
Glenolden, PA 19036

Highway Secrets

One of our readers from California, who wishes to remain anonymous, recently had an encounter with a disabled armored truck. The armored truck was painted olive green -- every inch of it. Parked in front of the truck was a Ford Bronco with four men sitting inside. Behind the truck was a late model Chrysler with four additional individuals sitting inside. All the men were dressed in casual civilian attire.

Being a concerned citizen, Mr. Anonymous stopped his car to render assistance. Before he could open his door, two of the men approached on either side of his vehicle.

"Can we help you, sir?" one of them asked.

When Mr. Anonymous offered his assistance, he was politely thanked and then asked to depart.

On top of the armored truck were two base loaded three foot whips that would seem to indicate radio operation in the VHF low or high band. There was no mention of the type of antennas (if any) on the two civilian vehicles.

Mr. Anonymous asked in his letter if I or any of MT's readers could unravel some of the mystery surrounding the incident.

First of all, let me say this. If anyone sees a disabled truck, regardless of its color, with eight men (no telling how many were actually inside the truck) sitting around it, *just keep on driving*. Don't stop, don't blow your horn, don't wave, just drive. Eight men could have pushed the truck to its destination!

There are escorted trucks that transport uranium, missiles and other sensitive material on our highways. The escorts ride in front and behind the truck. They are government agents, specifically hired to protect the shipment with an arsenal that would easily rival the fire power of a small army field tactical unit.

Since deadly force is authorized, any sort of confrontation, no matter how casual, may have serious complications.

However, the green armored truck with two escorts has me puzzled. I can only speculate on the contents. Anyone care to comment?

Scanning the Unknown

As a scanning enthusiast, I realize that people living in Los Angeles, California, don't really care about the frequencies being used in Philadelphia, Pennsylvania. The feeling is mutual on either side of the coin. But there is a "trick of the trade" that can be applied to any published frequency -- no matter what the location.

Simply enter the frequency into your scanner and listen. Sure, there are scanner publications that could be researched to determine if the frequency is active in your area. But every active frequency is not listed in a publication. This is especially true for military and federal frequencies.

Here's an example: If you are looking for an elusive state park frequency, look up the state park frequencies for several states and then punch them into your scanner. A

good national reference that lists frequencies by state is *Monitor America* by SMB Publishing, P.O. Box 244, Natick, MA 01760.

Mystery Reader

From Grand Forks, North Dakota, an anonymous reader who calls himself DXR 102, sent in a ten page computer printout containing hundreds of frequencies. Here are a few of the more interesting loggings.

Grand Forks Air Force Base

150.150	Missile convoy
150.350	Missile pad security
173.4375	Base hospital
173.5375	Taxi service
173.5875	Fire and crash crews
266.200	Air rescue
228.00	ICBM launch control center
413.025	Commander's frequency
413.450	OSI frequency, possibly 1 of 4 being used
417.200	Nuclear materials handling and protection service

Anyone interested in receiving the complete listing should send a business envelope with 40 cents postage.

The World of 4th Images

John Dorsey, of Quinton, Virginia, wrote, claiming to hold the world record for 4th order images in the distance department. It seems that John has monitored the 4th image of a television broadcast tower some 80 miles from his home.

Before we give John the world title, we thought that it would only be fair to check with our readers. Is there someone that can shatter the 80 mile limit? Are there any 5th, 6th, or 7th world image holders out there?

Roof Top Scanning

When you are a dedicated scanning nut, your eyes are always scanning the rooftops. Such was the case during my recent visit to the Washington D.C. area. Of particular interest was the long wire antenna that nearly runs the length of the IRS building.

Is this part of the movement at the White House to integrate all federal government agencies to HF communications? I don't know. Mention the IRS and everyone runs for cover.

Well, I'm not afraid to pick on the IRS. If the situation arises, I'll even pick on Larry Miller!

Does anyone care to take a stab at the IRS antenna? Hello? ...Where did everyone go?

The Scanning Report



An Inside Look at Uniden

Uniden Corporation of America, manufacturer of Bearcat scanners, recently acquired the assets of Regency Electronics's Consumer Electronics Division. To allay the fears of many scanner owners, we are pleased to present this interview between Bob Grove for Monitoring Times and Paul Davis, National Sales Manager for Uniden.

MT: With the acquisition of Regency's Consumer Electronics Division, Uniden now enjoys a stronger competitive edge. What is your anticipated market share and who are your major competitors?

Davis: We have a major share, well over 50%, but we don't subscribe to a service so we don't know the actual numbers. Cobra is a major competitor even though we supply them the equipment. AOR is a major competitor as is Radio Shack (to dealers, not us as a manufacturer). The scanner business is not a large industry and we control a lot of the patents.

MT: Uniden has recently moved into new corporate offices in Dallas. Won't Radio Shack feel you breathing down their necks?

Davis: No, Radio Shack is our biggest customer. We have an even closer relationship with them now and sell them scanners, radars, CBs and ham radios--their version of our new HR2510 ten-meter transceiver is in their fall catalog.

MT: Whom do Uniden and Regency product owners contact for warranty and repair now?

Davis: Uniden Service Center, 9340 Castlegate Drive, Indianapolis, IN 46256.

MT: Will Regency continue as a separate product line or be combined with Uniden?

Davis: Regency will continue as a two-step distributor line, sold exclusively by Regency representatives to small retailers, not through mass merchandising chains as Cobra is. The Polaris marine line will be continued and our President CB and radar detectors are being re-introduced in September.

MT: With Uniden's strong posture against cellular listening, why are new scanners being introduced with the capability of having their cellular deletion restorable?

Davis: When the microprocessors were being designed, the cellular association hadn't met to decide on their official position concerning cellular-capable scanners. I suspect that the option was built in to allow or exclude cellular coverage, depending upon the final decision. I was not involved at that time.

MT: What familiar Regency and Bearcat products are being discontinued?

Davis: The entire Regency scanner line is being discontinued with the exceptions of the 1070, 1090 and 2060. The Informant series will be re-introduced next year with new engineering. Three new Regency hand-held scanners will replace the discontinued Uniden BC55XL, BC100XL and the new BC200XLT.

MT: Whatever became of the high-tech BC1000 scanner that has been on the drawing board for several years?

Davis: It is still under development and will probably be introduced next June.

MT: What is the growth status of the scanner market?

Davis: This has been an exceptional year so far, up 7-10% over last year. We have not seen the familiar summer slump in sales. I believe the scanner market will continue to grow as public awareness of scanners grows.

MT: Will Uniden be re-examining the shortwave market in the near future?

Davis: No.

MT: What is the significance of the introduction of the HR2510 amateur radio transceiver?

Davis: If it does well, we will definitely look into other amateur radio equipment.

MT: What does the consumer marketplace see as the emerging field and how will this affect Uniden's scanner thrust?

Davis: Small mobile scanners like our BC560XLT are becoming increasingly popular among drivers.

MT: Any closing comments for MT readers concerning the future of recreational listening?

Davis: During the past six months we've seen a real resurgence in scanner business. I attribute this to two things: 1. An older population that gets great enjoyment out of this type of listening; and 2, more people becoming aware of scanners--more than a hobby, they find scanners very useful for information and protection.

The Scanning Report

Picking on the Ruskies

Regular readers of this column also realize that I love to pick on the Soviets. I suppose that it has something to do with my six year marriage to the Marine Corps.

The Soviets read this magazine. No doubt that a copy of *MT* finds its way into the Russian Embassy every month.

Here at *Monitoring Times*, we do our best to protect sensitive material by refusing to publish information that may jeopardize national security or the life of a law enforcement officer. But Soviet agents do not expect to find all the answers at one location. They're like squirrels. They run around gathering small tidbits of information from various locations. In their quest for information, Soviet agents have been known to purchase college term papers from students.

After the information is gathered, it is sorted and analyzed. It's a rather unique way to piece together an otherwise unsolvable security puzzle.

So, if you are in college and a stranger offers to buy your term paper, feed him a bag of peanuts.

Medivac Monitoring

Imagine for a moment that you're at the scene of an accident. The Medivac helicopter lands and then quickly departs with the more seriously injured on board. For the most part, everyone breathes a sigh of relief. It's just naturally assumed that the helicopter will get to the hospital safely. Sometimes, it doesn't.

In 1986 nearly nine percent of the nationwide emergency helicopter services were destroyed or damaged in crashes. Four of the crashes resulted in 13 fatalities.

The crash and injury rate, according to the National Transportation Safety Board, is 1,500 times greater than commercial aviation rates and 100 times greater than general helicopter rates.

However, Medivac flights do save lives. One life flight operation in Houston, Texas, has flown more than 20,000 accident free hours. To help solve the problem, the FAA is proposing set guidelines to regulate Medivac pilot training and to institute minimum visibility requirements.

Hydroplaning on the Ohio River

Mike Borman of Evansville, Indiana, asked about the frequencies being used by the Unlimited Hydroplane Race Teams on the Ohio River. Mike claims they race once a year, but he just can't seem to discover their frequency.

Monitoring Near the Roanoke River

Howard Weaver of Roanoke, Virginia, sent along a list of frequencies for his community and asked if we would pass them along. No problem, Howard, and thanks for your encouraging comments.

Roanoke, Virginia

39.36	County sheriff
155.790	County sheriff, channel 2
155.130	City police
155.490	City police, channel 2

154.319	Fire department
47.42	Red Cross
158.150	Water department
158.820	Street maintenance
463.950	Roanoke Times newspaper
167.175	Blue Ridge Parkway main channel
171.575	Jefferson National Forest

Ending Radio Horseplay

How many times have you heard horseplay on a radio frequency? From anonymous mike clicks to foul language, many agencies are plagued by employees that just love to clown around on the air.

Control Signal Corporation of Denver, CO 80227, is producing a low cost automatic vehicle identification system. The encoder mounts in the vehicle's radio and automatically transmits an ID number every time the microphone is depressed.

The decoder is a small box that can be placed right next to the dispatcher's radio. It provides the dispatcher with a display and printed copy of vehicle identification, date and time of each call.

Many agencies are installing the units during off hours -- hoping to catch the "clowns" red handed.



And a good time was had by all . . .

Bob Kay (foreground) at the Northeast Scanning News Picnic (Photos by Larry Miller)



"The Largest Dealer of Scanners in the World"

SCANNER WORLD, USA®

10 New Scotland Ave., Albany, NY 12208 518/436-9606



SPECIAL
Regency®
MX-3000

Special \$169.99
(\$7.00 shipping)

30 CHANNELS—MOBILE/BASE —SCANNER WORLD EXCLUSIVE—

Features include simple programming of the following frequency ranges: 30-50 MHz, 144-174 MHz, 440-512 MHz. Digital display, priority, search, lockout, delay, dim control, top mounted speaker, one year factory warranty. Includes AC & DC cords, mobile mounting bracket, telescopic antenna. All for only **\$169.99** plus \$7.00 shipping (optional extended warranty: 3 years \$39.99; 2 years \$29.99.) MX3000 Service Manual \$5.00.

Cobra® SR-15

\$209.99 (\$7.00 shipping)

100 channel pocket sized hand-held scanner (6"Hx1"Dx2 3/4"W) no crystal, portable scanner 29-54 MHz, 118-174MHz, 406-512 MHz, bank scanning, backlit LCD display, automatic search, lockout, scan delay, priority, key lock, plus much more. Includes rubber antenna, rechargeable Ni-Cad battery pack, AC adapter, charger, earphone and carry case. optional cigarette lighter adapter #15MPC \$12.99



BEARCAT 100-XLT Hand-Held 100 Channel	\$219.99	(7.00)
BEARCAT 70XLT Programmable Hand-Held	169.99	(6.00)
BEARCAT 50XL Programmable Hand-Held	119.99	(5.00)
AD100U AC Adapter/Charger for 50 XL	12.95	(.00)
BP55 Ni-Cad Battery Pack for 50XL	13.99	(.00)
VC001 Carry Case for 50XL	11.99	(7.00)
PS001 Cigarette Lighter Adapter for 50XL/100XL	12.95	(.00)
BEARCAT 140 AC Programmable Scanner	94.99	(5.00)
BEARCAT 145XL AC Programmable Scanner	99.99	(5.00)
BEARCAT 175XL AC Digital Scanner	159.99	(5.00)
REGENCY TS-1 Turbo Scan AC/DC	239.99	(7.00)
REGENCY TS-2 Turbo Scan 800 AC/DC	339.99	(7.00)
BEARCAT 210XLT AC/DC Digital Scanner	199.99	(7.00)
BEARCAT 800 XLT AC/DC Digital Scanner	279.99	(7.00)
REGENCY HX-1500 Hand-Held Scanner	224.99	(7.00)
REGENCY MA-257 Cigarette cord for HX1000/1200	16.99	(.00)
REGENCY MA-917 Ni-cad Battery for HX1000/1200	24.99	(.00)
REGENCY HX-CASE Hvy Leath. case for HX1000/1200	19.99	(.00)
REGENCY MA-549 Drop in charger for HX1000/1200	89.99	(5.00)
REGENCY MX-3000 AC/DC Digital Scanner	169.99	(7.00)
REGENCY Z-30 AC/DC Digital Scanner	129.99	(5.00)
REGENCY Z-60 AC/DC Digital Scanner w/ Air	139.99	(7.00)
Mobile Mounting Bracket for Z Scanners	5.99	(.00)
REGENCY ACT-R1 AC/DC Crvs. Single Channel	75.99	(4.00)
REGENCY RH-256B High Band Transceiver	359.99	(7.75)
REGENCY UC 102 Hi-VHF Hand Transceiver	119.99	(5.50)
REGENCY RH-600B High Band Transceiver	429.99	(7.75)
REGENCY R806 AC/DC Crystal Scanner	79.99	(5.00)
REGENCY INF-1 Informant Receiver	249.99	(7.00)
REGENCY INF-2 Informant Receiver	324.99	(7.00)
REGENCY INF-3 AC Informant Receiver	249.99	(7.00)
REGENCY INF-5 AC Informant Receiver	199.99	(7.00)
REGENCY R1090 Digital AC Scanner	147.99	(7.00)
COBRA SR12 Digital Hand-Held Scanner	189.99	(6.50)
COBRA SR10 Digital Hand-Held Scanner	129.99	(6.00)
COBRA SR900 AC/DC Digital Scanner	104.99	(5.00)
COBRA SR295 AC/DC Digital Scanner	109.99	(7.00)
Book "Top Secret Registry of Gov't Frequency" 6th	13.99	(3.00)
Book "Covert Intelligence, Electronic Eavesdropping"	8.95	(.00)
Book "Betty Bearcat Frequency Directory"	14.95	(.00)
Book "Rail Scan Directory"	7.95	(.00)
Book "Air Scan Directory"	12.95	(.00)
RCD MRP-1 Single Channel Hand-Held	38.99	(3.00)
FANON M8HLU DC Crystal Scanner	89.99	(5.00)
FANON PSK-1 AC Adapted for M8HLU	12.99	(.00)
FOX BMP-1060 AC/DC Digital Scanner	129.99	(5.50)
FOX Mounting Bracket for BMP-1060	9.99	(.00)
ANT-1 Magnet Mount Mobile Scanner Antenna	29.99	(3.00)
ANT-6 Base Scanner Antenna w/50' cable	29.99	(3.00)
REGENCY RD-ONE Radar Detector	39.99	(4.00)
REGENCY CB-ONE CB Radio	34.99	(5.00)

Regency®

Z30
30 Channel

Automatic Programmable Scanner

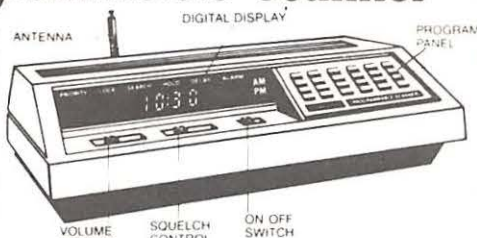
Scanner World Special

\$129.99

(plus \$7.00 shipping each)

Optional Accessories:

Cigarette Lighter Plug RGMPC... \$4.95
Z Mobile Bracket — **Special**... \$5.99



The Regency Z30 is a compact, programmable 30 channel, multi band, FM monitor receiver for use at home or on the road. It is double conversion, super heterodyne used to receive the narrow band FM communications in the amateur, public safety and business bands: 30-50, 144-174, and 440-512 MHz. Size 10 3/4"Wx2 7/8"Hx8 3/8"D.

Sophisticated microprocess-controlled circuitry eliminates the need for crystals, instead, the frequency for each channel is programmed through the numbered keyboard similar to the one used on a telephone. A "beep" acknowledges contact each time a key is touched. The Z30 scans approximately 15 channels per second.

Any combination of two to thirty channels can be scanned automatically, or the unit can be set on manual for continuous monitoring of any one channel. In addition, the search function locates unknown frequencies within a band.

Other features include scan delay, priority and a bright/dim switch to control the brightness of the 9-digit Vacuum-Fluorescent display. The Z30 can be operated on either 120 VAC or 12 VDC. Includes one year warranty from Regency Electronics (optional 3 yr extended warranty only \$39.99, gives you a total of 4 yrs complete warranty or 2 yr extended warranty only \$29.99, gives you a total of 3 yrs complete warranty.) Z-30 Service Manual \$5.00.

SCANNER WORLD SPECIAL

COBRA
SR-925

\$109.99

(plus \$7.00 shipping each)



Digital programmable, 16 channel, AC/DC mobile/base, with raised button keyboard for easy programming of the following frequency ranges: 29.54mhz, 118-174mhz, 406-512mhz. Covering aircraft, marine, police, fire, weather, trains, public service, plus much more. Features include: digital display, priority, scan delay, weather button, channel lockout, search, scan speed, automatic squelch, memory backup, one year factory warranty, external speaker jack. (Extended warranty 2 years extra \$29.99, 3 years extra \$39.99.)

REGENCY Z-60

Same features as Regency Z-30

With the addition of aircraft 118-136mhz and FM broadcast 88-108mhz. Z-60 also receives a total of 50 channels.

ONLY \$139.99

(plus \$7.00 shipping each)

BEARCAT 70XLT

20 CHANNEL HAND-HELD SCANNER

Small size 6"Hx1"Dx2 3/4"W, full digital readout, priority, search, channel lockout, scan delay, key lock. Covers following frequencies: 29.54mhz, 136-174mhz, 406-512mhz. Package includes rubber antenna, rechargeable Ni-Cad battery pack, AC adapter/charger, and carry case.

SPECIAL PACKAGE DEAL \$169.99 (\$6.00 shipping each)

ORDERING INFORMATION

Call (518) 436-9606 to place orders by phone or mail orders to **Scanner World**, 10 New Scotland Ave., Albany, NY 12208. Orders will be shipped same day received by United Parcel Service. **Scanner World** accepts VISA, MasterCard (COD shipments by United Parcel will be for cash or certified checks only). Mail orders with personal or business checks will be held 4 weeks for bank clearance. Orders with cashiers checks or money orders shipped same day received. Prices, specifications, and terms subject to change without prior notice. If items are out of stock we will backorder and notify you of delivery date. All shipments are F.O.B. **Scanner World** warehouse in Albany, NY. We are not responsible for typographical errors. All merchandise carries full manufacturers warranty. Bid Proposals and Purchase orders accepted from Government agencies. Free full line catalogue available upon request. No minimum order. New York State Residents add 7% sales tax. Any claims must be made within 7 days of merchandise receipt.

SHIPPING CHARGES

(* Add \$5 per scanner, and \$3.00* for all accessories ordered at same time. C.O.D. shipments will be charged an additional \$3.50 per package. Full insurance is included in shipping charges. All orders are shipped by United Parcel Service. Shipping charges are for continental USA only. Outside of continental USA, ask for shipping charge per scanner.

Scanner World, USA®
10 New Scotland Ave., Albany, NY 12208
(518) 436-9606
Most orders Shipped Same Day Received!



Bearcat
BC-600 XLT

\$249.99 (\$7.00 shipping)

Digital Programmable 100 Channel Scanner

BC-600 XLT covers the following frequencies: 29-54 MHz, 118-174 MHz, 406-512 MHz. Features compact size of 6.5" H x 1.5" W x 7.3" D. scan delay, priority, memory backup, channel lockout, bank scanning, key lock, AC/DC power cords, telescopic antenna, mounting bracket supplied one year factory warranty, search direct channel access, track tuning, service search including pre-programmed frequencies by pushing a single button for police, fire, emergency, aircraft, weather, and marine services. Plus exclusive optional features never available on any scanner before. First is an RF receive amplifier for boosting weak signals for only \$24.99 plus a CTCSS tone board is available for only \$59.99 to make this the number one scanner available in the USA. Optional cigarette lighter plug #600MPC \$4.99.

BEARCAT BC-950XLT

Same features as BC-600XLT but also receives 800-954mhz.

\$289.99 (\$7.00 shipping)



An Ace in the Hole

It seems like only a couple of months ago that we told you about the first scanner from a firm called "ACE Communications." Then there was two. And now three. But first, a little about ACE.

ACE Communications is a subsidiary of Tokyo-based AOR and the sole North American distributor for AOR scanners. AOR itself gets its name from the ham call sign of one of the founders of the company - JA 1 AOR -- and has been a supplier of radio devices for 18 years. The AR 900 is the third unit introduced by AOR in seven months.

Enough background. What is the AR 900 all about? Well, according to the manufacturer, it's an extremely small (5-3/4 high x 2-1/8 wide by 1-3/4" deep) 100 channel hand held that offers complete public service band coverage.

Twenty-five front panel keys allow programming of five banks of 20 channels. Pairs of upper and lower limits for bands to be searched can be stored in five separate search memory locations. All information is stored in three state-of-the-art permanent memories which, unlike many other units, never lose program information should the batteries be disconnected.

Extra features include first channel priority, keyboard lockout, BNC antenna connector, and an extremely well done blue-green display backlight for night use.

The LCD itself offers 22 separate prompting annunciators to aid the user in operating the unit.

Just 12 ounces in weight, the new AR 900 can be put in your pocket or in an optional leather carry case. Suggested retail price is \$299.00 (includes 450 MAH rechargeable battery, AC charger/adaptor, two antennas, and a stainless steel belt clip. For more information, write to ACE Communications, 10707 East 106th Street, Indianapolis, IN 46256 or call (317) 842-7115.

MFJ-1286 Gray Line DX Advantage

Got an IBM PC/XT/AT or compatible computer? Desire to go hunting for the big DX game? If the answer is yes to both of these questions, check out MFJ's Gray Line DX Advantage for Personal Computers. It predicts DX propagation by giving users instant access to Gray Line positions for any place in the world at any time and date from now until 1990.

Even the casual DXer can work rare DX by knowing exactly when the conditions are best. Included is a high resolution world map that displays the moving Gray Line, UTC times, time zones, sun position over the earth and latitude/longitude markers.

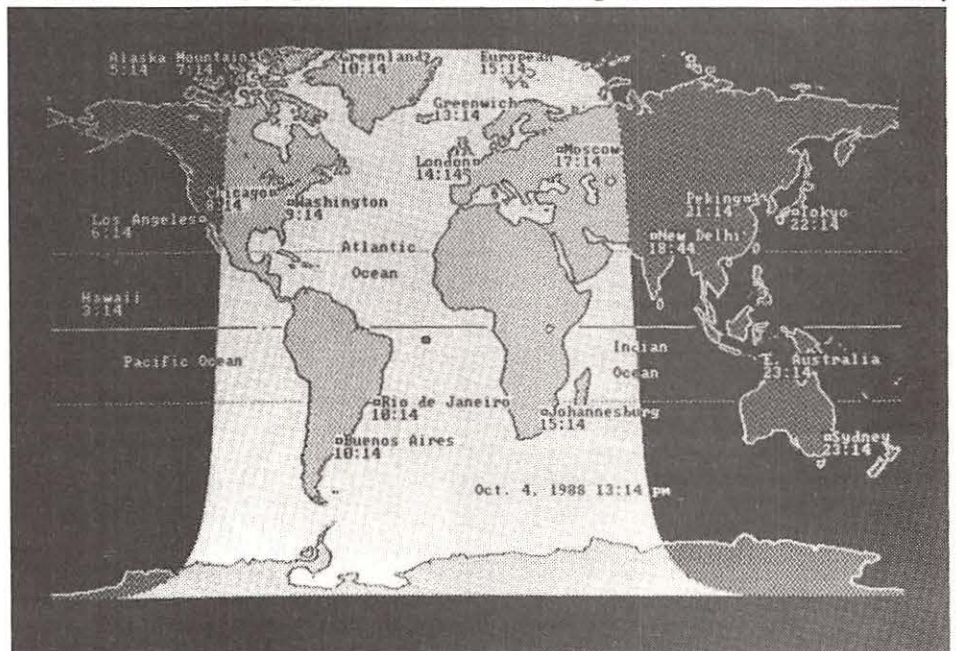
We didn't receive an MFJ-1286 Gray Line DX Advantage to test so we can't tell you how well it works. But we can say that it sounds pretty good. Find out more about this \$29.95 DX tool from MFJ, write P.O. Box 494, Mississippi State, MS 39762 or call toll-free, 1-800-647-1800.

New MFJ-109 World Time Clock

I knew I had seen the MFJ-109 World Time Clock somewhere before. But where? And then I remembered. There on page 247 of last year's *World Radio TV Handbook* was the same neat looking little gadget, here called the "Azimuth World Time Dual Zone 24 Hour Station/Travel/Alarm Clock." Quite a mouthful. I liked MFJ's name for it better. I also liked MFJ's price better. In the *Handbook* ad, the Azimuth version was \$19.95. MFJ's is just \$18.95.

In any case, here's what you get for your twenty dollar bill. A small (2" x 4.5" x 5) little clock with a sliding indicator you can set to any one of 24 international cities that gives you both local and 24 hour time in a 3/8" LCD display.

Packed into this little unit is also an alarm with snooze function, night light, adjustment for daylight saving time and date change indicator. It comes with a nifty



suede-like carrying case. To order, use your charge card and call 1-800-647-1800 or write MFJ at P.O. Box 494, Mississippi State, MS 39762.



The Essential Radioteletype Frequency List

By Dallas W. Williams

Most first-time listeners to radioteletype (RTTY) are at a loss trying to determine whom they are hearing. Dallas Williams makes the task much easier with his new list of sure-fire frequencies.

Each listing, sorted by frequency--2 through 25 MHz--includes speed and shift, call sign, service and location, as well as time of intercept to give the listener a head start on scheduling his monitoring.

Just as important is the handy list of identifiers at the back of the book. Next time you see "6VU" roll across the screen you will know you have found one of the services from Dakar, Senegal.

With many listeners' references selling from \$12-\$40, this little guide is a bargain. (81 pages, 8-1/2" x 11", staple bound; \$10.95 plus \$2 shipping from Tiare Publications, PO Box 493, Lake Geneva, WI 53147)

Scanner Master: NY Metro/Northern NJ Guide

Edited by Warren M. Silverman

Of all the scanner frequency directories on the market, it is especially appropriate that the most professionally printed should be for the New York City metroplex. Scanner Master has a history of quality in their publications and this newest release is on bond paper stock with glossy cover; maps are sharply drawn and organization of the material is well thought out.

Simply the finest scanner handbook ever produced!

SCANNER MASTER

New York Metro/ Northern New Jersey Guide

3rd Edition



SCANNER MASTER, for over 10 years the publisher of the most comprehensive and detailed communications manuals in the nation, is proud to announce the availability of the 3rd edition New York Metro/Northern New Jersey Guide.

After an exhaustive period of updating and adding to the second edition work, SCANNER MASTER has culminated its efforts in the totally re-written and re-designed third edition for the New York Metro region. This latest version is our first full-sized fully typeset manual — beautifully presented with easy to read typefaces — and contains the most up-to-date and accurate public safety listings our firm has ever printed. Close to 500 pages in length, this third edition is also our most thorough and detailed manual yet.

At SCANNER MASTER, we not only verify frequency usage when possible, we also tell you who is using the channel, and in conjunction with what other agencies or as part of which network. We also explain for what purposes radio systems have been designed and how they work for the agencies involved. We discuss the operations and the make-up of important departments, as well as list their radio codes, unit designator numbers and the like. We've added hand-drawn and shaded maps of different departments to better inform you of jurisdiction and unit locations. We've included organizational charts which neatly describe the hierarchy of various agencies. All so you can understand what you're listening to and better appreciate the hobby and art of two-way monitoring.

In the New York Metro area, the most complex two-way radio mecca of our nation, SCANNER MASTER makes monitoring the airwaves easier, more interesting and much more fun.

- 10-codes, maps and descriptions and addresses of state, county, regional and local public safety radio systems
- New artwork includes 5 New York City Fire maps, New Jersey State Police map, Nassau County Precinct map, and United States Coast Guard map
- Gazetteer (all communities alphabetically cross-referenced)
- Detailed discussions of New York City police, fire, EMS.

PUBLIC SAFETY FREQUENCY SEQUENCE SORT

All public safety licenses within a 100 mile radius of New York City, sorted by frequency - a superior updated list.

Price \$24.95 + \$1.75 postage (MA & CT residents please add sales tax). Send check or money order to: Scanner Master, P.O. Box 428, Newton Highlands, MA 02161. Or call with your credit card order: (508) 881-8000 — (if you reach our answering machine, leave your number and the best time to call back)

Call or write us for a complete list of all of our scanner titles nationwide!



tional and sporting activities are included as well.

If you are within 100 miles of New York City, this is your scanner guide! (470 pages, 8-1/2" x 11", perfect bound; \$24.95 plus \$1.75 shipping from Scanner Master Company, PO Box 428, Newton Highlands, MA 02160; phone 617-881-8000)

New from Radio Shack

The basic organization of the book is by state and county, with the New York City area getting the largest share, of course. Cities are listed alphabetically, with unit identifiers and special uses as known.

An exhaustive frequency cross-reference allows the listener to identify quickly an unknown station discovered while searching; police and fire dispatch codes are also generously sprinkled throughout the book.

Police and fire agencies, while the greatest interest to scanner buffs, are not the only licensees covered in the directory. A liberal number of hospitals, ambulances, transportation agencies, educational institutions, health agencies, courts, recrea-

The 1989 Radio Shack catalog has a number of new products of interest to listening enthusiasts, but few surprises. Carryovers from last year include the leading PRO-2004 scanner as well as models PRO-26, 27, 38, 2010, 2011 and 2021.

New models are the PRO-33 (replaces the PRO-32), PRO-56 (replaces the PRO-55), PRO-57 (programmable 10-channel desktop scanner, \$139.95) and, of special interest to scanner monitors, the PRO-35.

Intended to take on the rival Bearcat 200XLT, the Realistic PRO-35 offers 800 MHz coverage and 200 memory channels; it will sell for \$329.95.

Guide to Increased Listening

Some of you folks have been following my antics for the last three years in the North American Shortwave Association's bulletin, *FRENDX*. Well, Bob Grove and Larry Miller have given Old Uncle Skip a chance to share his particular brand of radio fun here in the pages of *Monitoring Times*. If we've crossed paths in the past, you probably know that my particular "schtick" is low cost alternatives in a "gold plated" radio hobby. It's my goal to let people know that radio listening can be enjoyed on a paper route budget. So hail to old friends and greetings to new, let's get to it.

I am blessed with what is known in our society as a "Liberal Arts Education." Essentially that means I could never quite figure out what I was going to be when I grew up. But out of this melange I actually learned a few things.

One of those things is something sociologists call THE RUT THEORY. This goes back to the days of horses and buggies. When people came to a fork in the road, over time, they tended toward the path with the deepest ruts because that is the way the pony would go. Over time, the other path would be overgrown through lack of use and disappear from common knowledge.

Get to the point, Skip!

As I said earlier, my gig is to show you folks how to keep more of your hard-earned cash in your pockets. The best way to save money is not to spend it in the first place. During WWII people were fond of a phrase, "Use it up, wear it out, make do!"

I submit that many of us are in a rut. We have become hooked on listening to only a small portion of what our receivers are capable of hearing. In doing this, we are wasting money, and more importantly, missing out on some very exciting monitoring. So it is time for ... (drum roll please)

Uncle Skip's Guide to Increased Listening!!

Shortwave:

*So many frequencies,
So little time*

If you are concentrating your listening on the international shortwave broadcast bands, you are missing out on a whole passel of pleasure, Bunkey. Here you are with a radio that probably tunes continuously from 0 to 30 MHz and you are leaving 50 percent or more

of the bands spread lonely and unexamined. Just take a look at Larry Van Horn's *Utility World* loggings in this issue. All kinds of neat stuff out there in radioland!

I find the U.S. Coast Guard frequencies to be more fun to listen to than my scanner's police and fire frequencies. With increased power to take action upon boarding pleasure craft, it should be exciting listening to be sure. And who can deny the lure of "spy numbers"? Add to that up-to-the-minute weather reports anywhere on the planet and you have got yourself a lot to play with. And guess what? In these days of SW broadcasters cutting down on QSLing, when you QSL a Ute, you might just get a nice personal letter from a real human being; what a novel idea.

On the other hand, if you have been chasing utilities for the last several months I can most assuredly recommend SW broadcast programming over anything the boob tube has to offer. You can learn a great deal about the world around you by giving a good listen to world news broadcasts. You'll learn things you never read in the local newspaper.

Another interesting area is listening to amateur radio stations. You can hear all manner of interesting folks from all over the world all having fun playing radio. QSLing hams is okay; just make sure you make it clear that you are a listener.

One word of caution -- you might want to shy away from using any SWL "call sign" or WDX number. Some hams have the wrong idea about these indicators. Don't forget return postage; most amateurs don't have public relations budgets. You can locate address information on amateur stations via ham radio *Callbooks*. Check your local library, consult with a nearby ham or write Radio Amateur Callbooks, 925 Sherwood Drive, Box 247, Lake Bluff, Illinois, 60044.

Citizen's Band: 40 channels, no waiting

I am a survivor of CB '70s. Remember when everyone tried to talk with a southern accent and called everybody "Good Buddy"? Remember those folks who only got on the air to ask for radio checks? Remember all those people stuck in traffic jams asking where "Smokey" was? President Ford's wife had a CB set and the FCC did away with complicated licensing and gave us 40 channels and everyone still crowded into channel 19!!

Those days are thankfully gone, leaving a more mature and more exciting hobby. But

most CBers still manage to limit their listening to their "Home Frequency." Old Uncle Skip's advice is to SPIN THE DIAL!! See who else is out there, talk to them, find out what they are using their personal radio privileges for. If you are a gregarious type, why not try to find out about your local REACT group? Contact REACT INTERNATIONAL, INC., 242 Cleveland, Wichita, KS 67214 for more information about this public service group.

VHF-UHF:

The scanner scene

Modern receiver technology has put the synthesized frequency scanner in the hands of almost every listener. Unfortunately, many folks behave like they are still crystal controlled. They punch in the local police and fire frequencies and then stick the scanner on top of the refrigerator. Access to unlimited coverage of several bands of frequencies is no trivial privilege. So okay, you know all the prominent local frequencies. So push the envelope! Try something new! Use the scanner to scan.

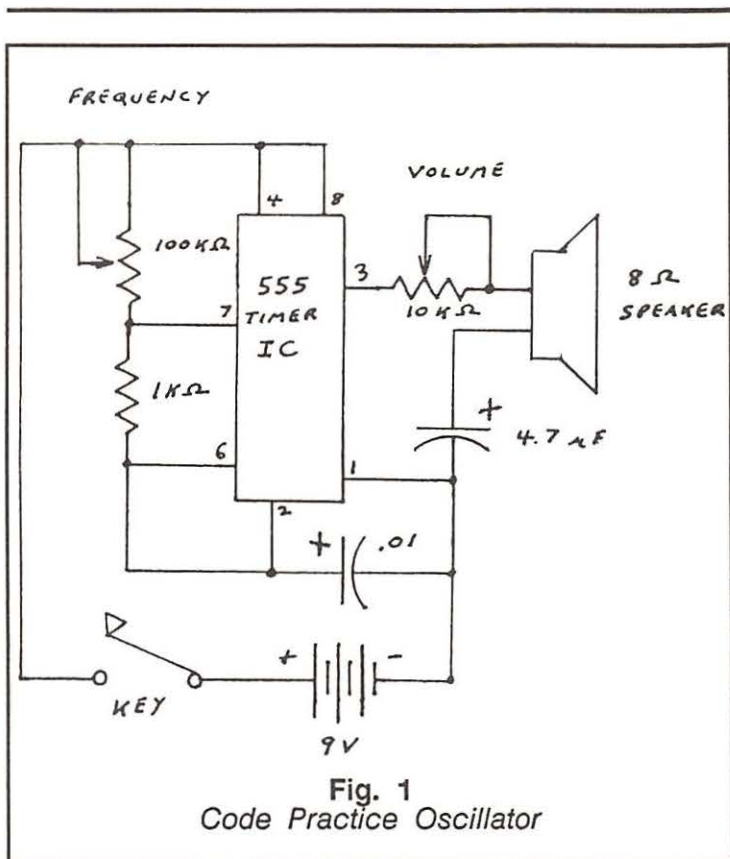
See what else is out there in the air. Since handi-talkies have come into being, you can drive along and see many construction crews and survey teams jabbering away. Maybe you could give a listen for such communications in your area. With more and more business and public agencies discovering the practicality of radio it should be worth the trouble to regularly scan those "dead" frequencies. You might be the first in your area to log some new VHF or UHF resource.

Medium Wave:

Who said AM is dead?

Okay, so you have done your complete day and night bandscan of your local stations. You have dug out most of the clear channel stations across the country. You have caught several powerhouses off the air on early Monday mornings, monitoring the little guys to be found underneath. So now what? Time to go digging in THE GRAVEYARD.

The graveyard frequencies are those set aside for local broadcasters. 1230, 1240, 1340, 1400, 1450, and 1490 kHz are full of stations usually limited to 1000 watts daytime and 250 watts nighttime power levels. It takes a diligent medium wave DXer to wade through the static and slop but many rare and exciting catches can be had if you give a listen to the



graveyard. All of the MW club magazines have special listings of graveyard achievements, rightfully recognizing this aspect of MW broadcast listening as noteworthy.

If you travel during your business day you might try examining the distance you can carry a local station's signal. It's fun to compare your personal findings with those of the published coverage maps that stations use for advertising sales.

You can also go international. Start looking between the standard North American 10 kHz channel spacing to the 9 kHz spacing common to other parts of the world. Spain, Portugal, Peru, Sweden, Belgium, actually most of the countries shortwave listeners go after can be found on the 9 kHz spaces. They are rare, but they are out there.

Amateur Radio: No excuses

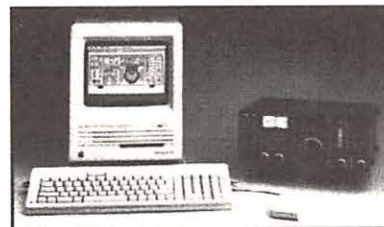
Ham radio operators should never have a reason to gripe. In addition to the opportunity to talk to a myriad of other stations around the world about everything under the sun, hams can participate in many forms of public service and experimentation. Some hams get hung up on one band or mode. I know I'm guilty of forgetting that my shack does contain a code key. And by not utilizing my CW privileges I am probably missing out on a lot of contacts, especially with DX stations.

Even if the day actually comes that the bands are totally dead and you have worked every country and every ham, the dedicated amateur can still have a load of fun. You can take all of your expertise and pass it on. You can go down into the novice portions of the bands and help some newcomer grow into the hobby. If every amateur radio operator made one novice band contact per week I am sure we would see a great deal of growth in the hobby. Helping new hams is the most rewarding aspect of the hobby, worth its weight in DX.

Some Thoughts on Code

International Code transmission is still a viable form of radio communication. On the HF bands, amateurs and professional users abound. Even VHF monitors can use code to log repeater and beacon

Secret Frequencies!



Turn those hours of searching for secret frequencies over to the Remote Computer Scanning System. The RCSS runs on any Macintosh, and gives you complete monitoring and automatic logging of all signal activity found by your R-7000*. You're no longer limited by the built-in frequency storage, search, and selections provided by ICOM*. Why waste time spinning dials when the RCSS can do it for you?

- Discover new frequencies and record their activity
- Scan unlimited banks of frequencies
- Search designated frequency ranges; activities are automatically recorded
- Automated statistical frequency log maintained
- Import/Export information between the built-in database and most Macintosh databases
- Customized versions available

Complete System including Interface, Software and Manual for only \$189.95 • Dealer Inquiries Invited

Call or Write for More Information and Customized Versions

Systems and Software International, Ltd.
4639 Timber Ridge Drive • Dumfries, VA 22026



(703) 680-3559

* R-71A version available soon



IDs.

Being able to copy these messages gives you the chance to log something new. Learning the code is simply a matter of practice. But learning it can be pretty boring. Code tapes or monitoring stations like W1AW for code training can put even the most dedicated person to sleep. You will need to practice with these resources if you hope to become proficient, but Old Uncle Skip would like to propose an alternative. This plan will require the cooperation of another interested party, so grab a friend.

Once you have used the tapes and broadcasts to master the basic alphabet and numbers, get hold of a code key and code oscillator. You can build one out of parts available at your local Radio Shack (figure 1). Start sending back and forth with your buddy. You will find that this adds an element of fun to the learning process that sterile code transmissions fail at. As you increase in ability start monitoring amateurs, first in the novice bands and then on the other CW frequencies. You'll be copying at speed in no time and you will be opening up a whole new facet of the listening hobby.

Very few radio listeners utilize all of the frequencies available to them on their respective receivers. Regular trips to uncharted (and unlogged) frequencies will greatly enhance your enjoyment. And you won't even need to run out and spend one thin dime on new equipment. Don't forget to keep reading *Monitoring Times* to keep abreast of all there is to hear. Use it up!!!

If you have any ideas or feelings about enjoying our monitoring hobby on a budget, why not drop me a line at P.O. Box 644, Waterford Works, NJ 08089. This column is a new venture for *Monitoring Times* and we look forward to your input and opinions.

mt

Monitoring Southern Arizona

Arizona is best known as the Grand Canyon State. A national park of the same name occupies a site in the northern part of the state. In the south, however, it's better known for illegal activities than for tourist attractions. One of these illegal activities is drug smuggling. The other owes to the state's border with Mexico which makes it ideal for aliens making their way into the United States.

The United States government is directly involved with the law enforcement actions pertaining to both issues in southern Arizona with a continually increasing effort being put forth. The United States Air Force is also represented in southern Arizona at Davis-Monthan Air Force Base (DMAFB).

DMAFB is a TAC base whose main activity is the training of Thunderbolt A-10 pilots. It's also the location of the Aircraft Maintenance and Regeneration Center (AMARC) where the government mothballs aircraft in the desert.

The mission of each federal agency and the military are related by the sharing of facilities and resources in southern Arizona. The Federal File will present the monitoring of southern Arizona in two parts. The first part presented this month is the radio operations of CNF, U.S. Border Patrol (BP) and the U.S. Customs Service (USCS). The second part will be presented next month on DMAFB and AMARC.

Into the Forest

The Coronado National Forest is named after Spanish explorer Don Francisco Vasques de Coronado who set out with an expedition in 1540 from Mexico in search of gold. Instead of gold, the explorer led his men through trails into a vast and empty place filled with grassy hills, cactus, desert wildlife and scattered, rugged mountain ranges.

Today, the CNF is arranged into twelve mountain range units located throughout southern Arizona. The U.S. Forest Service (USFS), an agency of the U.S. Department of Agriculture, administers the CNF and provides law enforcement and fire protection functions. Table 1 lists the standard frequency configuration of base and vehicle (mobile) mounted radios in the CNF net.

The personal portable (hand-held) units have essentially the same configuration with the exception being only fourteen channels instead of sixteen channels. Channels 11 and 12 are user selectable channels for all units. Channels 15 and 16 are user selectable for base and vehicle radios only and channel 7 is user selectable for hand-held units only. The user selectable channels are for radio communications with local area agencies. The channel configuration listed is that used in the Tucson area with optional channels shown.

Fires and Monitoring

A forest fire started in Mexico and moved northward into Arizona into the CNF while I was in Arizona. It was located to the south of Sierra Vista and required 1,200 personnel and multiple air and ground units to combat the fire. The damage and devastation cannot be fully comprehended from a ground-based view. The Sierra Vista CNF forest fire presented the USFS with an international problem that I learned about through local news media.

The origin of the fire was in Mexico, but by weather and wind predictions it was known that there existed an excellent possibility that the fire would enter the United States into southern Arizona. The USFS is not permitted to cross the imaginary line between the U. S. and Mexico to fight the fire prior to its entering the U.S. without receiving permission first from Washington DC. Washington, in turn, must request permission from the Mexican government. The problem here is, of course, time.

In addition, should the blaze cross the border, it must be treated as two separate fires: the one in Mexico and the one in the U.S. Fortunately, an agreement is under consideration which would permit the attacking of fires before they crossed this imaginary line and without all the red tape.

Table 2 lists the active frequencies monitored during the forest fighting effort. The source of the frequency data was previous



O-2A observation aircraft utilized by border patrol

Table One
CNF FOREST NET

CH	RECEIVE	TRANSMIT	DESCRIPTION
1	169.600	169.600	CNF Main Operations -- Simplex
2	169.699	170.525	CNF Repeater
3	168.625	168.625	Air Emergency
4	168.200	168.200	BIFC TAC 2
5	168.150	168.150	CNF TAC 1 Simplex
6	168.150	168.675	CNF TAC 1 Repeater
7	168.350	168.350	USFS National Ground Dispatch
8	170.000	170.000	Ground-to-air
9	156.610	156.610	Pima County Sheriff F2
10	155.700	155.700	Pima County Sheriff F3
11	166.350	166.350	Saguaro National Monument
12	154.370	154.370	Rural/Metro Fire
13	154.280	154.280	Arizona State Forestry
14	170.025	170.025	CNF TAC 2
15	155.955	155.955	LERN

monitoring and the list in the U.S. Government section in *Police Call* radio frequency directory available at Radio Shack.

Not Always Hot

When the area is not on fire, CNF offers many recreational facilities including the Mount Lemmon ski area northeast of Tucson. Mount Lemmon is the highest point in southern Arizona. As a result, it also acts as the location of a repeater for a number of radio services. The U.S. Government Microfiche lists quite a few radio operations here so I set out one morning in search of the repeater site.

I obtained a map of the Mount Lemmon area and found a service road open to the public. The road quickly deteriorated to a dirt and stone (not gravel) rut which became impassable in my timid little rental car. So small was this road that when I decided to execute a three point turn to go back down the mountain, I found that I was stuck!

The only other alternative (other than calling the rental car people and telling them their car was on the side of a mountain) was to back down the mountain service road for approximately a mile. After some time passed, a point was reached where I could turn the car around and park it. I then hiked the remaining distance with cameras in hand.

What I found was the host site for a multitude of repeaters and translators carrying private, public safety, federal and military radio operations. The microfiche listed services and frequencies from 25 MHz to well into the GHz region!

An accompanying photograph illustrates

CNF service road to the antenna tower on Mt. Lemmon, highest point in southern Arizona.

several antennas utilized by government users. Near the bottom of the photograph are three antennas -- the antenna on the left is directional UHF or microwave link for fixed station (FX) use, in the middle is a VHF with four sections, and at the far right is an antenna enclosed in a small radome. In the center of the photograph is a tower with several VHF and UHF omnidirectional antennas mounted with stand-offs from the tower.

It should be noted that quite often the UHF FX stations may be monitored when the VHF counterpart is not even heard.

The Border Patrol and Customs Service are also very active in southern Arizona with large enforcement efforts in place by both agencies. The Border Patrol has a dual role in which they monitor for both illegal aliens and drug smugglers. An effective way to cover this vast area efficiently is by aircraft and both the BP and USCS utilize a variety of air cover units.

Balloons Stop Drug Flow

The USCS recently launched an "Eye in the Sky" program. A helium-filled aerostat (a blimp-like craft) is stationed at Ft. Huachuca near Sierra Vista. It's 245 feet long and 72 feet in diameter and is the first of six to be stationed at 150 mile intervals along the U.S.-Mexican border within the next year.

The tethered blimp contains radar equipment that can track targets up to 250 nautical miles. The data gathered by the aerostat is then relayed by a microwave link to a ground based trailer van. The obvious intent is to track low flying, drug laden aircraft heading north into the U.S. When an aircraft is tracked without a prefiled flight

Table Two
Forest Fire Fighting Freqs

122.850	Heliport Operations at Fire Camp
122.925	AIR TAC Operations (Tankers and Helicopters on Scene)
168.100R	Administrative W.R.T. Fire Fighting Effort
168.200	Bureau of Land Management (BLM): On Scene Units
168.625	AIR NET and AIR DISPATCH
169.600R	Coronado Dispatch to Fire Units
169.600S	Fire Fighting Ground Units -- On Scene
411.525	CNF UHF Link (Often of 169.600 Transmissions)
414.650	Dial Tones Frequently
415.400R	Service Net for Fire Camps

Table Three
Misc Federal Freqs

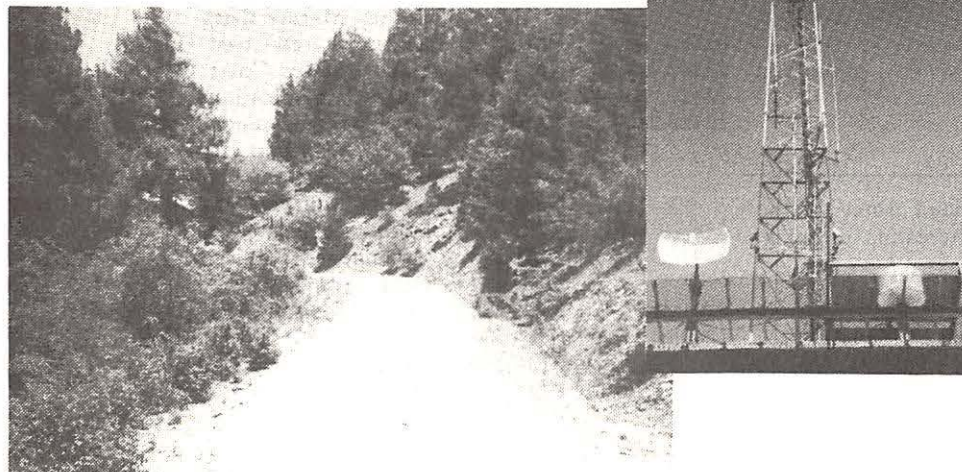
163.200R	U.S. Marshal Tucson Control
163.725R	"Lemmon" BP Repeater
163.775R	BP Repeater
165.2375R	USCS Repeater
165.7375	USCS Tactical Aircraft Operations
165.850R	BP Tactical Repeater (Generally Car-to-car)
170.675	BP Input to 163.725 Repeater
418.900R	DEA Repeater (Phoenix Units-100s, Tucson-200s)

plan or with its transponder off, the USCS dispatches an air intercept unit. The aerostat is similar to those used off the Florida coast.

The USCS maintains an aviation branch at DMAFB from which aircraft are dispatched. An HF net is also utilized by the USCS aviation branch in addition to the VHF frequencies listed in Table 3. The USCS also utilizes a modified P3 based in Phoenix that can track 2000 airborne targets simultaneously while scanning a 300 degree sector. Once again the intent is to track low flying aircraft from Mexico. The P3 in conjunction with the aerostat can cover the entire southern Arizona border with Mexico.

The BP utilizes observation aircraft such as the O-2A and the O-10. The observation aircraft are low altitude aircraft intended for visual observation and surveillance. The O-2As are being phased out, but some still remain in active use. The observation aircraft can monitor situations from an excellent vantage point and direct ground based units to the subject or target. Other aircraft are in use with some borrowed from the military.

Next month's Federal File will present the operations of DMAFB and discuss the military aspect in southern Arizona.



SW Frequencies for Californians

(and others with good rigs)



On medium and high frequency upper sideband, some of the following frequencies should provide some interesting listening.

2096.5	KXC 684	Oceanic Society
	WHF	Tug Communications
2182	KXC 684	Oceanic Society
	WHF	Tug Communications

2670	NMC	United States Coast Guard
4125	KJA 504	Chevron Telecommunications
	KOZ	Delta Steamship Lines
	KXZ 684	Oceanic Society
	KZB 861	Collins Marine Corp
4134.3	NMC	United States Coast Guard
4144.6	KMC237	Greenpeace Foundation
	KXC 684	Oceanic Society
	KZB 861	Collins Marine Corp
	WSQ	States Steamship Co
4419.4	KMC237	Greenpeace Foundation
	KZB 861	Collins Marine Corp
4428.7	NMC	United States Coast Guard
4434.9	WHF	Tug Communications
6200	NMC	United States Coast Guard
6210.4	WHF	Tug Communications
6218.4	KJA 504	Chevron Communications
	KMC237	Greenpeace Foundation
	KOZ	Delta Steamship Line
	KXZ 684	Oceanic Society
	KZB 861	Collins Marine Corp
	WSQ	States Steamship Co
6221.6	KMC237	Greenpeace Foundation
	KXC 684	Oceanic Society
	KZB 861	Collins Marine Corp
6506.4	NMC	United States Coast Guard
6521.9	KMC237	Greenpeace Foundation
	KZB 861	Collins Marine Corp
8241.5	NMC	United States Coast Guard
8281.2	WHF	Tug Communications
8284.4	WHF	Tug Communications
8291.1	KOZ	Delta Steamship Line
	KXC 684	Oceanic Society
	KZB 861	Collins Marine Corp
	WSQ	States Steamship co
8294.2	KJA 504	Chevron Telecommunications
	KMC237	Greenpeace Foundation
	KOZ	Delta Steamship Line
	KXC 684	Oceanic Society
	KZB 861	Collins Marine Corp
8765.4	NMC	United States Coast Guard
12342.4	NMC	United States Coast Guard
12421	WHF	Tug Communications
12429.2	KMC237	Greenpeace Foundation
	KOZ	Delta Steamship Line
	KXC 684	Oceanic Society
	KZB 861	Collins Marine Corp
	WSQ	States Steamship Co
12432.3	KMC237	Greenpeace Foundation
	KXC 684	Oceanic Society
	KZB 861	Collins Marine Corp
12435.4	KXA 504	Chevron Telecommunications
	KMC237	Greenpeace Foundation
	KOZ	Delta Steamship Line

13112.3	KZB 861	Collins Marine Corp
16565	NMC	United States Coast Guard
16587.1	WHF	Tug Communications
	KMC237	Greenpeace Foundation
	KOZ	Delta steamship Line
	KXC 684	Oceanic Society
	KZB 861	Collins Marine Corp
	WSQ	States Steamship Co
15690.2	KMC237	Greenpeace Foundation
	KXC 684	Oceanic Society
	KZB 861	Collins Marine Corp
16593.3	KMC237	Greenpeace Foundation
	KOZ	Delta Steamship Line
	KZB 861	Collins Marine Corp
22124	KMC237	Greenpeace Foundation
	KZB 861	Collins Marine Corp
	WSQ	States Steamship Co
22127.1	KMC237	Greenpeace Foundation
	KOZ	Delta steamship Line
	KZB 861	Collins Marine Corp
22130.2	KMC237	Greenpeace Foundation
	KZB 861	Collins Marine Corp

High frequency CW should have something to offer.

4247	KPH	
6383	NMC	United States Coast Guard
6477.5	KPH	
8574	NMC	United States Coast Guard
8618	KPH	
8642	KPH	
12808.5	KPH	
13002	KPH	
16880.9	NMC	United States Coast Guard
17016.5	KPH	
17016.8	KPH	
22476	KPH	
22557		

On VHF the following may also prove worth a listen.

156.350	KMC237	Greenpeace Foundation
	KXC 684	Oceanic Society
156.425	KMC237	Greenpeace Foundation
	KXC 684	Oceanic Society
	KZB 861	Collins Marine Corp
	KZH 976	Golden Gate Yacht Club
	WXZ317	Pier 39 Marina
156.450	KZB 861	Collins Marine Corp
	WHF796	Morrison Knudson Co
156.500	KEA 988	Williams Dimond & Co
	KGW473	Tug Communications
	KPB 505	Drew Chemical Corp
	KZI 702	Transmarine Navigation
	WFA730	Blue and Gold Fleet
	WHD756	Interocean Steamship
	WHF	Tug Communications
	WQB572	Trident Navigation
156.550	KZU 237	Willamette Western
	WSQ	States Steamship Co
156.600	WSQ	States Steamship Co
	KEA 988	Williams Dimond & Co

THE ANT FARM

WANT A HIGH PERFORMANCE ANTENNA FOR YOUR MONITORING POST OR HAM SHACK? DON'T HAVE ROOM FOR A SUPER SIZE SKY WIRE?

YOU NEED A -SKY RAIDER- FROM THE ANT FARM

51 FEET OF PERFORMANCE ERECT AS A SLOPER OR HORIZONTAL. OPERATES FROM VLF TO 30 Mhz.

READ WHAT OUR CUSTOMERS SAY ABOUT THIS ANTENNA!

"My Sky Raider outperforms my Windom in every way at far less cost. Thanks for a great antenna. Charles McClasky W9JLZ, Wellston, OH"

"Put the Sky Raider in my attic (had to bend it a bit) and it works great. At last I can put out a decent signal on 80 meters. Many thanks. Bob Uleski N3FHI Fogelsville, PA."

"At last I can work all bands. My backyard is only 50 feet and your SKY RAIDER just fits. Outperforms trap sloper I had been using. Fantastic antenna. Tim Reinhard KA3RDB, Bethlehem, Pa."

ORDER YOUR SKY RAIDER NOW - COST IS ONLY \$39.95 POST PAID IN 48 STATES. (SHIPS TO \$45.95 NEXT MEXICO!)

Fully assembled, no measuring, cutting or soldering required. Assembled from high quality components - Hard drawn copper wire, stainless steel hardware, weather proof feed insulator. Feed antenna with 50 or 75 ohm coax.

THE ANT FARM
RD 1 BOX 181A
KUNKLETOWN, PA. 18058
Write for full line catalog



156.800	NMC	United States Coast Guard
	KMC237	Greenpeace Foundation
	KPB 505	Drew Chemical Corp
	KXC 684	Oceanic Society
	KZB 861	Collins Marine Corp
	KZH 976	Golden Gate Yacht Club
	KZI 702	Transmarine Navigation
	KZU 237	Willamette Western
	WGA730	Blue and Gold Fleet
	WHD754	Interocean Steamship
	WHF796	Morrison Knudson Co
	WHG842	American Navigation
	WQB572	Trident Navigation
	WSQ	States Steamship Co
	WXZ317	Pier 39 Marina
	WXZ339	Royal Charter Marine
156.900	WHG842	American Navigation
157.025	WXZ339	Royal Charter Marine
157.100	NMC	United States Coast Guard

The frequencies used by the U.S. Coast Guard at San Francisco can provide some interesting listening. Since it is a participant in the Automated Mutual Assistance Vessel Rescue System (AMVER) it will receive numerous messages relating to the positions of ships and the sailing routes which they are taking.

Steamship lines will have fairly routine traffic; however, some of the others should provide interesting traffic as well.

Low Band DX'ing

"September!" Summer is nearly over, fall is right around the corner and with it the low band DX season. While it is possible to work DX on the 160, 80 and 40 meter bands all year long, the summer QRN takes a lot of the fun out of it.

As the northern hemisphere of the earth approaches fall, the southern half of the globe is beginning spring. Conditions for working that VK, ZL or elusive African station is optimum as the static has not begun in the southern hemisphere and it is ending here in the north.

The Gray Line

The best time to work that station half-a-globe away will be during the hours of darkness. The reason lack of daylight is important to low band DX is that during the hours of daylight there are two densely ionized layers of the ionosphere called the D and E layers. These layers absorb a large portion of the energy your station transmits on 160, 80 and 40 meters. As nighttime approaches these layers rapidly dissipate allowing long range communication.

That portion of the Earth that is in twilight is called the terminator. As the sun progresses from east to west there is always some part of the globe seeing dawn as another sees evening. Now, as daylight wanes, the D and E layers fade away and signals can travel along this band of twilight with ease. The other end of this path will be dawn and the D and E layers have not yet formed.

Consequently we have a period of one half to one hour when low frequency signals easily span the globe! Dawn and evening do not occur at the exact same place and time each day and as a result some new and interesting DX may be waiting for you at any given twilight period.

There are several ways to compute when your twilight periods will be each day and exactly what portion of the earth will share this gray line with you. We will discuss how you can calculate this later.

Gear Requirements

Gear requirements are the same as the other bands. A decent 100 watt transmitter will be all the power you need to make DXCC on any of the lower bands. The antenna is a somewhat different problem. Normal antenna lengths are longer on the lower frequencies. However, if you have

room for a 20 meter antenna, chances are that you can erect a decent 160 or 80 meter antenna simply by utilizing the tower your other antennas are on, as a vertical.

Many avid low band DX operators use short verticals for 160 through 40. I use a Butternut HF-2V that is only 33 feet long. It is elevated 25 feet and there are 4 radials under it. Using this antenna on 80 meters with 50 watts, I have worked 135 countries in two years.

There are other amateurs using antennas as short as 20 feet to work DX on a regular basis on 80 and 40. To be sure, long high antennas work better. Or, if the room is available, phased verticals or even yagis will make you King of the Hill on these bands. As with any ham band you will be surprised at how well a modest station can get out! -- if you are willing to spend some time getting to know the gear and the band.

Noise

One factor that is difficult for many hams to overcome on 160 and 80 is man-made noise. Since so many of us use vertical antennas for their enhanced DX'ing properties (i.e. low angle of radiation), noise is especially bad because static -- both natural and man made -- are vertically polarized. The best solution to this difficulty is to use a separate receiving antenna. The most popular receiving antennas on these bands are the Beverage and loops.

Small indoor loops with a preamp are extremely effective DX receiving antennas. The loop antenna is quite directional and can null out QRM from local stations nicely too. The loop tends to cancel QRN and produces very good results in most locations.

The Beverage antenna on the other hand is rather large (one wavelength minimum). It is quite low (no more than 5 or 6 feet above ground) and grounded at the end. The normal Beverage is unidirectional although several schemes exist to enable the operator to switch directions. You will be amazed the first time you hear signals on a Beverage antenna. There is almost no noise and signals will be clear and distinct.

Learn More

It is impossible to give you all the details on working low band DX in one short magazine column. There are several excel-

lent sources of information for low band DX'ing and one which I highly recommend is the book, *Low Band DXing* by John Devoldere, ON4UN. This excellent manual takes you by the hand and shows you step-by-step how to set up your station, where to look for the best DX and the best times to work it. In addition, author Devoldere explains propagation in a way that makes it easy for the newest beginner to understand.

Antennas are discussed in great detail as well as methods of matching, grounding, types of antennas, installation techniques, efficiency and bandwidth. It's all there.

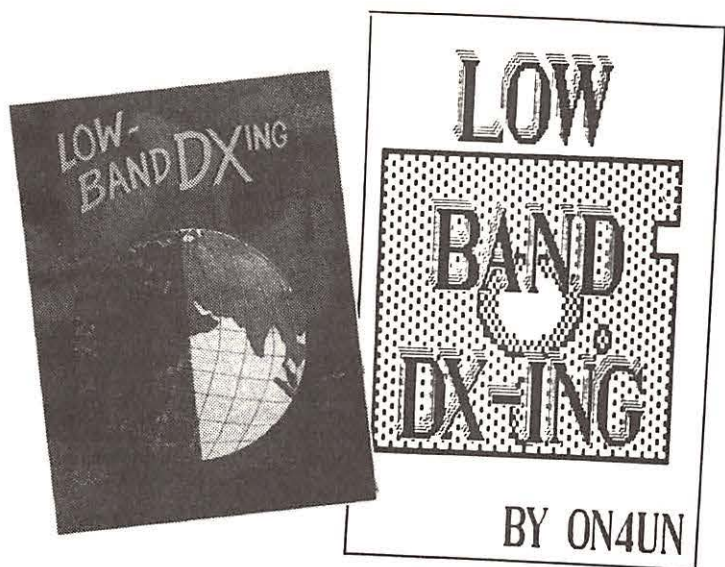
Other chapters detail CW and phone operation, awards and special operating practices. The chapter on DX'ing tools is worth the price of the book by itself. Hats off to ON4UN for this superb manual! *Low Band DXing* is available at all amateur stores or direct from the ARRL for \$10.00 plus \$2.50 S&H.

Computers in Low Band DXing

ON4UN describes many computer programs of value to the low band DXer in his book. In fact, there are thirty different programs described. They can be lumped into four groups, the first being propagation and operational aspects such as sunrise/sunset, great circle direction/distance and grayline programs. The second group consists of technical subjects -- for example, SWR calculations, coil design, RC/RL transformation and parallel impedances. A third group deals with antenna and feedline design, and the fourth group describes methods of designing feed systems for arrays.

These programs are available on disk for those of you who do not wish to create your own from the listings given. They are produced in five versions to cover all of the most popular computers. Cost is \$20.00 plus \$2.50 S&H from the ARRL, 225 Main Street, Newington, Ct. 06111. Order MS-DOS for IBM and compatibles, DOS 3.3 for Apple 2C or 2E, CP/M for Kaypro or Xerox and CB-128 CP/M for the Commodore C-128. There is also a version available for the MacIntosh at a cost of \$25.00 plus S&H.

I have used the IBM, Apple and MacIntosh versions and am extremely pleased with them. The MacIntosh version is superb and utilizes the many user friendly features of this fine machine.



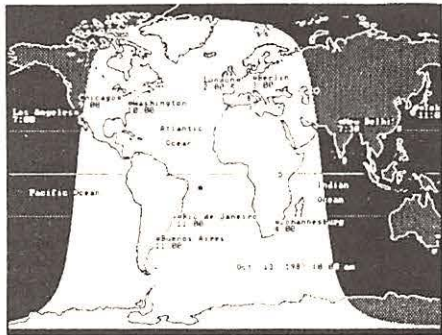
Great low band hints and helps are available through ON4UN's book and computer programs

More Gray Line Help

Another nifty program for the low band DXer is the MFJ Gray Line DX Advantage (Terminator). This program is available only for the IBM and clones. It puts a map of the earth on your computer screen and shows you the terminator for any given time. You can watch it change as the earth moves on its axis.

If you want to know what countries will be on your gray line next week or next month just speed the program up and it will show you. It's amazing to watch the terminator move across the face of the earth with this neat program. You can also display the time in up to 24 time zones or cities with this software. (Think about this before you place that next overseas phone call!).

The Gray Line DX Advantage is available from MFJ Enterprises, Inc., P.O. Box 494, Mississippi State, Ms, 39762, price is \$29.95 plus postage.



MFJ GRAY LINE DX ADVANTAGE

A Great Idea

The trend in new rigs has been more and more complicated bells and whistles. In fact, most of the folks buying these new rigs

do not make use of half of the available features simply because they do not fully understand how to use them. Perhaps it is too much trouble to put them into effect.

At last, someone has realized that there is a need for a good basic rig -- one that is easy to use and will not intimidate the average operator. That someone is Yaesu and the rig is their new FT-747GX.

This dandy little piece of equipment boasts 100 watts on all bands from 160 through 10 meters, built in CW filter, dual VFO's, noise blanker and split frequency capability. It works CW, SSB and FM (with optional module), has 20 memories and a fantastic receiver that covers 100 kHz through 30 MHz (so you can listen to all the interesting signals on SW. Operation is a snap with just a few easy to use controls.

If you are looking for a new rig, check it out! It doesn't have a jillion knobs and controls, but who the heck needs 'em? This neat little rig is going to take the frustration out of operating for a lot of hams! Try it. You'll like it!



Special Event Station

The Columbus Amateur Radio Association (Columbus, Ohio) is operating special event station W8TO on October 8 and 9, 1988. The station will be on the air from 1500Z to 0300Z on the 8th and from 1500 to 2400Z on the 9th.

The objective of the operation is to bring worldwide attention to the City of Columbus and the explorer Christopher Columbus and promote friendship between Columbus hams and hams and SWLs worldwide.

Frequencies of operation will be 7.240 MHz, 14.340, 21.375 and 28.500 MHz. All frequencies plus or minus 10 kHz. Mode is SSB only. All stations working W8TO and SWL's reporting W8TO will be eligible for a QSL.

There is also a special certificate issued for working or hearing ten Columbus stations. (Note: working or hearing W8TO is worth six stations. Working or hearing the same station on different bands counts separately.)

Submit an SASE (\$1.00 postage) or return envelope and IRC for QSL and certificate. Send a 9 x 12 envelope if you wish to receive an unfolded certificate. Mail to Roger Dzwonczyk, WB2EIG, 283 East Longview Avenue, Columbus, Ohio, 43202.

The station outside of Columbus who contacts the most stations in the city during the celebration will receive a plaque.





QSL from Paul Williams, Shaw AFB, SC

Australia:

Northern Territory SW Service, VL8T-(Tennant Creek) 2325 kHz, and VL8A-(Alice Springs) 2310 kHz. Full data QSL on station letterhead for both sites. Verification signer, Karen Kane, Broadcast Production Officer. Received in 18 days for one IRC and an English reception report. Station address: Box 9994, Darwin, Northern Territory, Australia.-ed.

Brazil:

Radio Marajoara, 4955 kHz. Full data QSL on station letterhead, and multicolored station sticker. Verification signer, Ronaldo Porto, Director Commercial. Received in 22 days for mint stamps and a Portuguese reception report. Station address: Trav. Vileta, 1121-Bloco A-Apto. 207, Pedreira-Belem, Para, Brasil.-ed.

Radio Nacional do Brasil (Radiobras), 11745 kHz. Full data color postcard of Rio's Sugar Loaf Mountain, without verification signer. Received in 24 days for one IRC, and an English reception report. Station address: P.O. Box 04/0340, Brasilia, Distrito Federal, Brazil. (Tom Sullivan, New Orleans, LA)

Burkina Faso:

Radiodiff.-TV Burkina (Radio Burkina), 4815 kHz. Partial data QSL on station form letter, without verification signer. Received in 100 days for one U.S. dollar, two IRCs and a French reception report. Station address: Boite Postal 7029, Ouagadougou, Burkina Faso, Africa. (Rod Pearson, St. Augustine, FL)

Central African Republic:

Radiodiff.-TV Centrafricaine, 5034 kHz. Full data African map card. Verification signer, Monsier Michael Bata. Received in 44 days after one IRC, mint stamps, and five French follow-up reception reports. Total time report outstanding was twenty two months. Station address: Boite Postal 940, Bangui, Republique Centrafricaine, Africa.-ed.

Costa Rica:

Radio For Peace International, 7375 kHz. Full data station logo card, information sheet, and personal letter from verification signer James Latham, Manager. Received in 40 days for one U.S. dollar, and an English reception report. Station address: Universidad de la Paz, Apartado 199, Escazu, Costa Rica, (Harold Frodge, Midland, MI)

Cuba:

Radio Habana Cuba, 6035 kHz. Partial data postcard of Havana's Lenin Park, without verification signer, and two souvenir postcards. Received in 60 days for an English reception report. Station address: Apartado 7026, La Habana, Cuba. (Rod Pearson, St. Augustine, FL)

Czechoslovakia:

Radio Prague, 7345 kHz. Full data color postcard of

Kromertz Chateau, without verification signer. Received in 30 days for an English reception report. Station address: Czechoslovak Radio, 12099 Praha 2, Czechoslovakia. (Bill Traister, Covington, TN)

Dominican Republic:

Radio Amanecer, 6025 kHz. Partial data postcard with personal letter from verification signer, Pastor Fidel Ferrer. Received in 60 days for one U.S. Dollar, and a Spanish reception report. Station address: Apartado 1500, Santo Domingo, Dominican Republic (Joseph A. Johnson, Savannah, GA)

Greece:

The Voice of Greece, 9395 kHz. Full data color postcard of Historic Landmarks, without verification signer. Received in 27 days for one IRC and an English reception report. Station address: p.p. Box 60019, 15310 Aghia Paraskeve, Athens, Greece. (Rod Pearson, St. Augustine, FL)

Hungary:

Radio Budapest, 9835 kHz. Full data "DX Club" card, without verification signer, pennant, schedule, and station stickers. Received in 25 days for an English reception report. Station address: P.O. Box 1, H-1800 Budapest, Hungary. (Tom Sullivan, New Orleans, LA)

India:

Madras Radio VWM Costal Marine Station, 8674.7 kHz. Full data QSL on station letterhead. Verification signer, R. Giopala Kinshnan, Asst. Engineer. Received in 115 days for mint stamps, and an English reception report. Station address: Madras Radio (P&T), Thiruvottiyur, Madras, 600019 India. (Larry Van Horn, Orange Park, FL)

Kenya:

Voice of Kenya, 6075 kHz. Full data QSL on station letterhead, and personal letter from Chief Engineer. Received in 270 days for one U.S. dollar, mint stamps, and an English reception report. Station address: Box 30456, Nairobi, Kenya, Africa. (Tom Sullivan, New Orleans, LA)

Mali:

Radiodiff.-TV Malienn, 4783 kHz. Full data African map card without verification signer, and a hand written program schedule. Received in 83 days for one U.S. dollar and an English reception report. Station address: Boite Postal 171, Bamako, Republic of Mali, Africa (Harold Frodge, Midland, MI)

Mauritania:

Office de Radiodiff.-TV De Mauritanie (ORTM), 4845 kHz. Full data African/station logo card without verification signer. Received in 65 days for mint stamps and one French follow up reception report. Station address: Boite Postal 200, Nouakchott, Islamic Republic of Mauritania.-ed.

Monaco:

Trans World Radio, 7105 kHz. Full data map card, without verification signer, and station pennant. Received in 65 days for one IRC and an English reception report. Station address: Boite Postal 349, Monte Carlo-98007 Monaco. (Joseph A. Johnson, Savannah, GA)

Mongolia:

Radio Ulan Bator, 12015 kHz. Full data "RUB" station logo card, without verification signer. Received in 240 days for three IRCs and an English reception report. Station address: C.P.O. Box 365, Ulan Bator, People's Republic of Mongolia. (Bill Traister, Covington, TN)

Morocco:

Radiodiff.-TV Marocaine (RTM), 11920 kHz. Full data large tan station card with coverage map. Verification signer, Tamane M'hammed Jamal Eddine. Received in 75 days for two IRCs and one French follow-up reception report. Station address: Boite Postal 1042, Rabat, Morocco, Africa.-ed.

New Caledonia:

Radiodiff. Francaise D'Outre Mer (RFO), 7170 kHz. No data map/logo card, without verification signer. Received in 54 days for one U. S. dollar, and an English reception report. Station address: Boite Postal G3, Noumea Cedex, French New Caledonia. (Harold Frodge, Midland, MI)

Papua New Guinea:

New Guinea Territory-Radio Western Highlands, 3375 kHz. Full data yellow and white map card, and personal letter from verification signer, Paul K. Ray, Acting Station Manager. Received in 90 days for mint stamps and an English reception report. Station address: P.O. Box 311, Mount Hagen, Papua New Guinea.-ed.

Peru:

Radio Ancash, 4991 kHz. Partial data Peruvian postcard. Verification signer, Armando Moreno Romero-Gerente. Received in 90 days for mint stamps and a Spanish reception report. Station address: Apartado 210, Huaraz, Ancash, Peru. (Tom Sullivan, New Orleans, LA)

Qatar:

Qatar Public Telecommunications Corp., Doha Radio-A7D, 8743.5 kHz. Full data QSL on station letterhead. Verification signer, Ali Al-Faham, Engineer/Manager. Received in 120 days for mint stamps, and an English report. Station address: P.O. Box 217, Doha, Qatar. (Larry Van Horn, Orange Park, FL)

Turkey:

Turkish Meteorological Service, 6900 kHz. Full data QSL on station letterhead, brochure, and program schedule. Verification signer, M. Cemil Ozgul, Director-General. Received in 30 days for three IRCs and an English reception report. Station address: P.O. Box 401, Ankara, Turkey. (Rod Pearson, St. Augustine, FL)

Uganda:

Radio Uganda, 4976 kHz. Full data QSL on station letterhead. Verification signer, L.B. Lubega, Senior Engineer. Received in 82 days for two IRCs and an English reception report. Station address: P.O. Box 2038, Kampala, Uganda, Africa. (Joseph A. Johnson, Savannah, GA)

United States:

KUSW, 17715 kHz. Full data station logo card, without verification signer, and station information sheet. Received in 42 days for one U.S. mint stamp and an English reception report. Station address: P.O. Box 7040, Salt Lake City, UT 84107 (Harold Frodge, Midland, MI)

WLNE-TV-Channel 6. Full data QSL on station letterhead. Verification signer, Phillip B. Taylor, Chief Engineer. Received in 60 days for one U.S. mint stamp, a self-addressed envelope, and an English reception report. Station address: 430 County St., New Bedford, MA 02741. (Larry Van Horn, Orange Park, FL)

Glossary of QSL Terms

Reception Reports:

A report of station reception, written by the listener that includes the date, time, frequency, transmission details, and overall quality of reception.

QSL:

A confirmation by a station in the form of a letter, card, or other document, that constitutes proof that a listener has heard the station's signal.

Verification Signer:

Signature on QSL by the person at the station that prepared the confirmation.

Full Data QSL:

A QSL that includes the time, date, and frequency of reception as indicated on the listener's report.

Partial Data QSL:

Exclusion on the QSL of either time, date, or frequency.

No Data QSL:

Date, time, and frequency excluded on QSL, and returned to the listener.

Mint Stamp:

Unused postage stamps included with the reception report -- to be used by the station for the return reply of a QSL.

IRC:

International-Reply-Coupon included with the reception report and exchanged by the station for return postage. Available at the post office.

Prepared QSL Card:

A card or form letter of confirmation, prepared by the listener that includes the date, time, and frequency -- the QSL is then signed, stamped, and returned to the listener.

Please remember: Send information on the QSL cards you have received to Gayle Van Horn at the address above. Send actual QSL cards to "QSL Editor", P.O. Box 98, Brasstown, NC 28902. They will be handled with care and returned promptly.

Knowing the Code

Morse code was developed by F.B. Morse in 1844. This code was set up in such a way that it would be possible for a human to communicate using different clicking sounds, because back then, the telephone wasn't invented. This form of communication worked well but there was one drawback. An experienced telegraph operator was needed at each location to send or receive messages. Teletype was invented because the operator only needs to know basic typing skills. The decoding of the beeps or clicks are done in the teleprinter.

The Baudot code is used to transmit the characters over wires or radiowaves. Machines work well with Morse or Baudot, however, in today's fast world of computers

and high speed data, new ways of transmitting characters are needed.

ASCII is the standard code which is used by most computers. It can do more than just send characters of the alphabet. Control codes which are special nonprinted characters, tell the computer what to do or to stop a printer, for example. Teletype machines also had control code. The bell, "Letters" or "Figures" or line feed are good examples. All of this sounds complicated but it is something that you will probably experience some day especially if you are a RTTY listener.

When you turn on the radio today, you will hear more than the familiar sounds of Morse Code. The bands are full of beeps and clicks and with a little experience, you can master the art of tuning in RTTY signals.

Nothing is more rewarding than to get that print-out for the first time. With RTTY, this experience can happen several times because there are other types that can be received. FEC, AMTOR, ASCII, TDM to name a few, are all spin-offs of the old Baudot. Each type of signal has its own characteristics and can be identified just by hearing the sound or reading the print-out. But I will get into that in future issues.

If "bull boards" are running up your phone bill, try packet radio!

The newest and most popular form of data communications is packet radio. If you are not a "ham radio" operator and you love to call up "bulletin boards," (I like to call them "bull boards") but your wife or parents are complaining about the high phone bill, packet radio is for you.

Ham radio operators use packet radio on HF or VHF to pass data using a box which is called a "TNC" or terminal node controller. The TNC connects to the computer or a device known as a video terminal

(which is like a computer but you can't play "Pac Man" on it). The other end of the TNC connects to the radio. One cable plugs into the speaker jack and the other into the microphone jack.

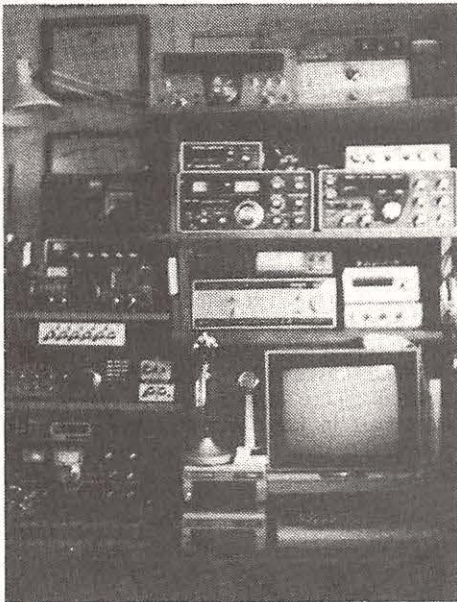
This simple hook-up opens up a new world to ham radio. Not only can you exchange data, but now it's error free. This means that a ham radio operator can send a 100 page document to another ham and every single character will be sent correctly. I use packet radio to send my shortwave loggings to a radio bulletin board. Then other hams can check the "board" and then copy or print out my loggings on their own computer.

There are some "All Mode" radio modems (or TNCs) that have packet radio capabilities. If you own a scanner, you can copy VHF packet in your area by connecting the TNC to your scanner and select 146.01, 146.03 or 146.07 which are popular nationwide frequencies. Use the commands: "PACKET" (if it's an all mode unit) or "MONITOR ON" to copy all of the "packets" on the channel.

Of course, you can't communicate with the hams because you don't have a license or the transmit capability on your scanner. But, you will be able to explore the new world of packet radio and maybe this will encourage you to get that ham license.

I have been copying strange signals on 5.0494 which sound like tones that sequentially change pitch. Can anyone identify these signals?

I need loggings! With the new look that MT has taken, I would like to add a loggings section to the RTTY column. But I need your help! If you send in your loggings, you will have the joy of seeing it in future issues. That way you will share your hobby with others all over the world. The RTTY column will now appear on a monthly basis. I will include subjects such as FAX, packet radio plus other modes of data communications and, of course, the RTTY loggings.



George Ford of Houston, Texas, sent in this picture of his completely outfitted listening post. If you're not listening to RTTY, George, you should be!

A listing of his equipment: PRO33 scanner, Panasonic DR22, MFJ Versa Tuner II, ICOM IC R7000, MFJ Grand Master keyer, Siltronix 1011D with frequency counter, Allied SX 190 McDymek DP40, Daiwa filter, MFJ Signal Enhancer, Yaesu FT101E and FR101, Bearcat DX1000, Kenwood meter, Morse A Word code reader, Ameco tunable preamp, Commodore 64 computer.

The World Satellite Almanac

Those who use their backyard dishes for movies, sports and entertainment need only a concise weekly satellite television guide to find out what's happening on the birds.

For the TVRO experimenter it's different. Information on listening to FM subcarriers, SCPC channels or keeping track of foreign news broadcasts is very hard to come by.

There have been a number of previously published books on the subject of home satellite television but they usually fall into one of two categories: the vaguely generalized book which is largely out of date by the time it's on the bookstore shelf or the highly technical tome designed for engineering professionals.

Author Mark Long has carved a very useful niche between these two with his *World Satellite Almanac* which is subtitled "The Complete Guide to Satellite Transmission and Technology." Published by the Howard W. Sams & Co. and containing 650 pages it sells for \$34.95.

Written in a style that does not require advanced degrees in electronics, the author demystifies the world of satellite communications.

What makes the first part of the book especially valuable for experimenters are chapters 3 (Satellite Voice and Data Transmission Techniques) and 4 (International Satellite Reception Techniques).

In chapter 3 you'll learn about analog and digital transmissions as well as Single Channel Per Carrier reception techniques.

In chapter 4 you'll discover tips on the techniques of international STV including modifying your feedhorn to receive the circularly polarized signals used by international satellites.

In Part II the author goes step by step around the Clarke Belt with everything anyone could want to know about each satellite. For example, page 338 starts a nine page description of Weststar 4. This includes operational history (it was launched 4-5-82 on a Thor Delta 3910 Booster); communications payload (Each transponder can carry 2,400 one way voice circuits on its 7.5 watt output.) and so forth.

Other pages feature foot print charts which show various levels of gain in the different contours of reception in the northern hemisphere. There is also a channel assignment plan which tells you, as of the publication date, who leases which transponder.

Finally, and most importantly to the experimenter, is a listing of all known Single Channel Per Carrier (SCPC) users on the bird. The charts, which in the case of W4 cover nearly four pages, lists the frequencies of the three main methods of accessing SCPC via the second IF loop-out on the back of your satellite receiver. (Don't fret, the world of SCPC will be covered in depth in a future column.)

Part III of the Almanac consists of

appendices including, among other things; intelsat reception parameters, launch schedules, a global directory of satellite delivered TV and radio services and a comprehensive glossary of terms.

The *World Satellite Almanac* is the home dishowner's source book for your questions about these marvelous tin moons 23,000 miles away.

The ESA is available from: The Sky Store 1-800-328-7733 and The STV Bookstore 1-800-234-0021

Incidentally, for those with deep pockets and a monthly need-to-know, Mark Long publishes a monthly newsletter entitled *World Satellite Update* at \$250.00 /year. A catalog of STV books and videos is also available through MLE, Inc. P.O. Box 159, Winter Beach, FL 32971.

BACK TO BASICS

Last month in this space we did a "site survey" to determine the best location for the installation of a satellite system. Now a brief TVRO primer is in order.

Microwaves from broadcast satellites are raining down in your back yard at this very moment. To make use of them you must gather up as many as you can and concentrate them on one spot. It turns out that a parabolic dish works perfectly to this end.

The microwaves all bounce up from anywhere on the surface of the dish to a little hook-shaped probe (which is the actual antenna) on the feedhorn. This very weak signal (at 4 GHz) is passed through a wave guide and immediately amplified by a Low Noise Block Converter (LNB) which converts 4 GHz to 950-1450 MHz which is fed into the satellite receiver.

Here the receiver processes the baseband or

raw video into 24 channels which is sent out of the receiver via a channel 3 or 4 modulator just like your VCR. Your TV set now becomes a monitor and all functions including channel selection, audio subcarriers, volume, Dolby NR, Narrow/Wide Bandwidth are all controlled from your satellite receiver. It really isn't very complicated.

So, what's the difference between the \$499 system and the \$2,999 system? Much of the price difference has to do with bells and whistles but even more of it has to do with the quality of the components. Let's take a quick look at each main part of the TVRO system.

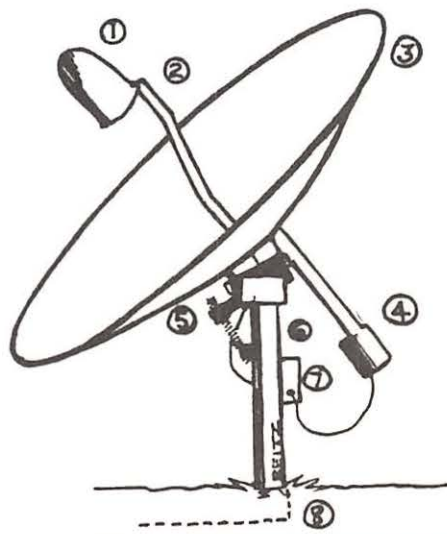
The Dish

The most important component in your entire system is your dish. It doesn't matter how great your receiver is if your antenna isn't equal to the task, you will not have good video. If you are going to scrimp anywhere in your system don't do it here.

Satellite signals hit the earth in a fairly focused beam called the footprint. Due to the nature of a globe, the signal on the edges of a foot print are weaker than the signal at the center of the footprint. Those living in the center of the footprint could get away with a dish as small as four feet in diameter, whereas, those on the fringes may need a dish as big as twelve feet! In general, excellent signals will be gotten from a 10 foot diameter dish no matter where you are in the footprint.

The most critical thing about a dish is its true parabolic shape. The actual parabolic dish and mount represents a big cost in any system. In order to cut costs some dish manufacturers produced dishes which left quite a lot to be desired. There were fiberglass dishes which were cast in imperfect molds; sectionalized panels that didn't fit together properly; mesh

1. Feedhorn (Probe, servo motor, waveguide, LNA and down-converter) covered by weather protector
2. Feedhorn support
3. Parabolic Reflector (dish)
4. Actuator Motor
5. Polar Mount
6. Mounting Pole
7. Weatherproof Box (contains terminal strip for various connectors)
8. Underground Direct Burial Cable



which disintegrated after a few years; hub and rib assemblies that wouldn't hold a parabolic shape; and other materials which could warp after a few years of intense heat and bitter cold.

There is no substitute for a top quality dish. They are easier to assemble, give better performance, and last longer. An imperfect parabola reduces antenna efficiency, introduces side lobes (a critical problem with 2 or 3 degree spacing between satellites, and turns your "ten footer" into an eight footer or less! Buy the biggest dish you can afford, but try not to buy one less than ten feet in diameter. If you buy a mesh dish make sure the holes are small enough to capture Ku band as well as C band. You'll be watching more Ku band in the next five years.

The best feedhorn/LNA support is a tripod or a quadrapod which allows the feedhorn to remain perfectly stationary (this is particularly critical for Ku reception). The most popular center mount "button hook" feed support is less stable especially in the wind. However, there are guy wire support retro-fit kits which enable you to secure your button hook.

The Polar Mount

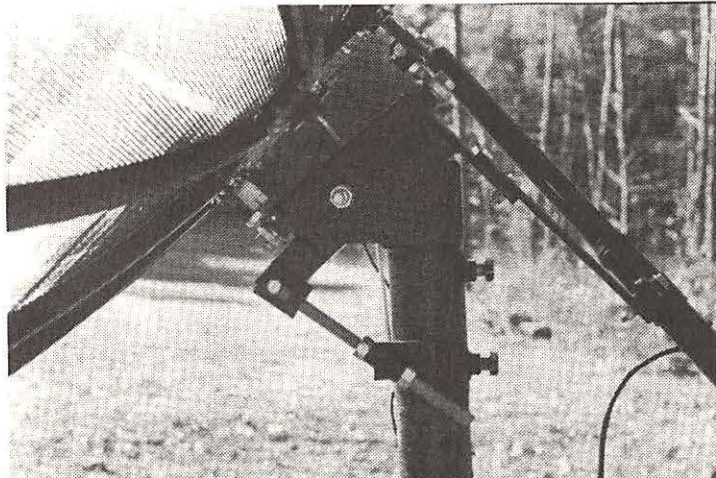
The polar mount is a device which attaches the dish and is set on the mounting pole. There are adjustments you will have to make to the polar mount which allows the dish to accurately track the satellite arc. Each mount will be adjusted according to the precise latitude of the dish location. Avoid all mounts that cannot be adjusted. Look for mounts which can be fine-tuned once the dish is on the pole. Better mounts will have ball bearing collars on the pivot points and grease fittings.

The Actuator

As with other components the actuator has undergone a drift to standardization. Today's dish drive is typically powered by 36 volts DC. It can be switched among reed, hall effect and optical sensors as required by the receiver and has a stroke of 18" which is sufficient length to track Satcom F1 in the west to Spacenet 2 to the east. (Intelsat experimenters still need a 24" stroke and a good view to the easternmost horizon.) The better quality actuator with its linear (extending and contracting) arm has plenty of accuracy even for the demands of Ku band birds.

Feed Horn Electronics

At a certain distance (the focal length) from the reflector (the dish) the captured microwaves are focused on a small metal hook inside the feedhorn. The hook is rotated 90 degrees by way of a small 9 volt servomotor on command of the receiver and thus changing the polarity of the signal. This allows the satellite to have its channels polarized both horizontally and vertically. As mentioned earlier, the signal is very weak and to be of any use it must be amplified greatly. The trick here is to amplify the signal without introducing anymore extraneous amplifier noise as possible. There's a good reason why they're called Low Noise Ampli-



Detail of polar mount: pivot points, actuator arm connection and adjustment bolts

NEW COMMUNICATIONS CATALOGS From Universal Radio

• SWL Catalog •

We have just published yet another edition of our famous shortwave listener's catalog. We offer a full line of receivers from \$50 to \$8000. Extensive RTTY and FAX equipment priced for every budget. Also featured are antennas, accessories and the best selection of radio books anywhere. See everything that is new for listening! 70 pages (5 by 8" format).

Only \$1.00 postpaid

• HAM Catalog •

Universal has been serving amateur radio operators since 1942. We are an authorized dealer for all major lines including Kenwood, Yaesu, Icom, JRC and Info-Tech. Our pricing is very competitive ... even with the no-service "warehouse" dealers. Whether you are a new Novice, or an old time Extra, you will like our new 44 page catalog (8.5 by 11" format).

Only \$1.00 postpaid

A Few of Our More Popular Shortwave Titles:

- 1988 World Radio TV Handbook \$ 18.95
- Shortwave Receivers Past & Present \$ 5.95
- Guide to Utility Stations 1988 6th Edition \$24.95
- FM Atlas & Station Directory 10th Edition \$ 5.88
- Shortwave Listening With the Experts \$ 19.95
- The World Below 500 KiloHertz \$ 4.95
- Passport To Worldband Radio RDI 1988 \$ 14.95

Universal Radio

1280 Aida Drive Dept. MT
Reynoldsburg, OH 43068
Toll Free: 800 431-3939
In Ohio: 614 866-4267

Please add \$1.00 shipping per book. (Catalogs are sent postpaid). Visa, Mastercard, Discover and checks accepted. Please note that catalogs are sent free with any book order.

fiers!

Noise temperatures in LNAs are rated in terms of degrees Kelvin (⁰K). The lower the noise figure the better the LNA. Only a few years ago the standard was 120⁰K LNA with 100⁰L considered excellent. Now noise temperature in the 55 to 75⁰K range are considered standard with some rates as low as 45⁰K. These are great technological achievements but labels can be deceiving. A 55⁰K Low Noise Amplifier/Down-converter (LNB) price point driven to achieve a lower noise figure may not perform as well as a 75⁰K LNB built with better components and measured at a different point in the circuitry.

Downconversion

The signal at the feedhorn as it enters the LNA is still at the 4 GHz range on which the satellite transmits. To be useful to the receiver the signal must be converted to a lower frequency. This is called downconversion. A few years ago the 4 GHz signal from the LNA was fed via RG-213 50 ohm coax cable with "n" connectors to the downconverter; usually located in a weatherproof box on the mounting pole.

A more efficient (i.e. less signal loss) way to downconvert would be to do so at the feedhorn. Now the signal is converted to 950-1450 MHz and sent via inexpensive RG6 75 ohm coax cable directly to the receiver. Another advantage for downconverting at the LNB is that the higher conversion can feed two or more independently operated satellite receivers (provided, of course, that both channels being watched are of the same polarity).

Next month: Foreign TV news, SCPC feeds, tightening up your dish and a look at satellite receivers.



David, Goliath, and the peons (*that's us*)

Summer auction and garage sale visits netted me several old console radios at fractional prices, all begging for restoration. Oddly enough, Topeka seems to be a ripper hunting ground for old cameras, another of my collecting manias. I still had time for some radio-related activities, however, including some DX.

I've also been trying to follow the continuing saga of the attempted resuscitation of AM radio by various facets of the industry, and, frankly, the picture I get is of various groups pointing at their neighbors and saying, "You do it!"

Some entities, notably the National Association of Broadcasters, seem to be attempting to push manufacturers and broadcasters in what they feel is the right direction, but unfortunately the NAB does not have enough leverage to coalesce the various forces into agreement and action.

Meanwhile, Leonard Kahn continues in the role of David against the industry Goliaths, railing against Motorola's attempts to establish its C-QUAM system as the U.S. AM stereo standard system. He is now filing suit against General Motors, claiming patent infringement in distortion reduction technology in Kahn's patents, which cover his AM stereo system.

At the NAB convention in Las Vegas, the improvement of AM radio was one topic of study, and many of the participants seemed to agree that the NRSC preemphasis standard provided an incentive for manufacturers to build better AM radios.

Only One Good AM Set

Most consumers would agree that except for the unique exception of the GE Superadio II the AM section of receiver combos is an afterthought. I cannot think of a single AM/FM receiver that I could purchase off the shelf today (except for the Superadio) and expect decent AM sound, selectivity, and sensitivity for under \$100, and darned few for over that price. And not very many FM sections for under \$100 give the consumer much quality, either, come to think of it.

We as DXers and listeners can do our part in promoting the improvement of the sound

quality of AM stations and subsequently receivers by contacting our locals and complimenting them on their "improved sound" after they install AM stereo or equipment to help them meet NRSC standards. They'll be pleasantly surprised at your reaction, and after a couple of calls, will be more willing to go out of their way to push manufacturers to produce quality receivers.

In the long run, this complimentary approach will work better than a negative one of complaining to the manufacturers, who react more quickly to other facets of the industry, rather than to the consumer, who buys shoddy equipment right now rather than waiting for better stuff to come along.

I know. I used to sell horrible hundred-dollar compact and component systems and couldn't keep them in stock. The buyers were more worried as to whether or not the system would fit in the room or match the color scheme than in its sound quality.

Nevertheless, we can't simplify the problem to one of simple re-education of the consumer. The advent of earphone radios, such as the Sony Walkman, did that, and a whole generation of listeners found out that FM stations really did sound better than AM stations, whose sound quality had been adjusted to sound best on car radios, not personal portables or home systems. And they abandoned AM in droves, thus helping to create the current crisis in AM broadcasting.

It's up to the broadcasters themselves to insist that manufacturers put decent radios into the hands of the consumers. How long will this process take? Probably longer than some stations can survive, unfortunately, unless they realize that consumers won't accept poor-quality sound any longer, accept the NRSC standards and modify their sound, and then find a broadcasting leader who will give the receiver manufacturers an order that they can't refuse. How about Peter Ueberroth, now that he's free...?

Crystal Sets

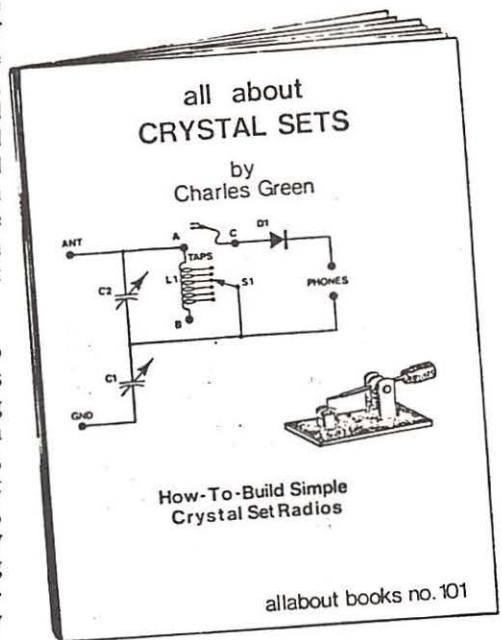
The saga of the crystal radio set continues; I'm still receiving mail on that subject!

Mrs. Leslie Edwards of Doylestown, Pennsylvania, wrote back to say that she had seen crystal radio kits in Radio Shack stores recently.

Bob Zirkelbach of Pleasant Hill, California, tells me that he constructed the crystal radio set from the plans I included in last year's November column, and it works! He was able to pick up all the components (except the galena crystal, the phone condenser, and, I presume, the oatmeal box) from Radio Shack.

"I substituted a germanium diode for the crystal, a 1N34A," Bob writes. "I used 22 gauge solid wire for the coil, and two rotary switches, Cat. No. 275-1385..."

"OK, Paul, my set is all finished. Now for the big test. I hook up the antenna to my SW longwire, and I hook up the ground wire and clip on the old Cannon Ball headset. I start twisting knobs. I have visions of Jack Armstrong, Tom Mix and other great radio shows of 'those thrilling



Another source of crystal plans is this book by Charles Green available from Allabout Books, P.O. Box 4155, Fremont, CA 94539.

days of yesteryear'. Hark! What do I hear? Is it BBC? No, it's KCBC in San Francisco, thirty miles away. Another twist and it's KGO, also in SF. Then KKIS and KSUN locals. I hear what sounds like a ham talking, but alas he is on SSB. This went on into the night. I logged seven stations; works great!!"

Bob also notes that Hope and Allen Publishing Company, who offer *Radios That Work for Free* at \$7.95 plus \$1.25, has a new address: P.O. Box 926, Grant's Pass, Oregon 97526. Has anyone else constructed a crystal radio recently? Let's hear about your results.

Ray Cole, of Cape Girardeau, Missouri, continues monitoring frequency deviations of his local radio stations to document a possible relationship between these deviations and earthquakes. If you'd like more specific information, feel free to write to me and I'll forward your requests to Ray.

FM/TV DX

J.K. Johnson of Savannah, Georgia, writes to mention that he has received distant FM and TV stations via tropospheric enhance-

ment and E-skip, which he calls "very common down here." His tip to us is that although he may hear a lot of FM stations during E-skip conditions, he doesn't always receive TV DX during the same conditions. That's a good point, and at coastal locations the reflection point for sporadic-E conditions might be in the middle of the ocean or a land area which has no FM or low-band VHF stations.

MT Loggings editor, Gayle Van Horn, generously forwarded to me some loggings from an exotic location by contributor Cliff Goodlet, Chattanooga, Tennessee, who listed some of the stations he heard from the Cayman Islands but complained about the overwhelming number of Cubans audible. On FM, he picked up locals on 105.3 MHz (R. Cayman); 89.9 (R. Cayman, simulcast with 1205 kHz most of the time, but not parallel with 102.25), and 101.1 (R. ICCI-FM, for International College of Cayman Island, all "elevator-type" music).

Look for new day/night AM stations to crop up on several frequencies, including 780 in Springville, UT, with 5 KW days, .45KW nights; 1180 in Claude, TX, 1/.25; 1200 in Sault Ste. Marie, ON, 10/7; 1250 in

Dakota City, NE, across the river from Sioux City, IA, with .5/.7; and graveyarder 1340 in L'Anse, MI, with 1/1. Thanks to NRC's Jerry Starr for these listings.

He also notes these new stations now on: WPBD-640 Atlanta, GA; WWLX-750 Lawrenceburg, TN; WGR-960 Prichard, AL; WJN-1180 Newburg, IN; and WJRA-1310 Priceville, AL. I've noted the 1030 outlet in Blue Springs, MO, now KBEQ, back on with a very clean sound, simulcasting KBEQ-FM. I've also heard several more stations on past sunset, exercising their new nighttime authorizations by broadcasting play-by-play of local baseball or softball games.

From NRC's *Domestic DX Digest Column* edited by William Hale comes word that KDFT-540 Ferris, TX, is on, programming oldies, and heard by Wally Wawro.

That's about it for this time. Remember, next month we'll publish plans for the best AM loop antenna and award the top prize in our contest. Until next time, 73!



Available Soon!

The First Annual

CQ Amateur Radio

Equipment Buyers Guide

The Active Ham's Complete Annual Reference Master

This valuable new master directory and buyer's guide will serve you day in and day out in searching out new gear, comparing new models, locating dealers near you and mail-order retailers around the country. It'll help you buy more wisely with its multi-reference concept to help you wend your way through the buying maze.

COMPLETE PRODUCT INFORMATION

It's a single-volume source book of the latest Amateur Radio gear all sectionalized by equipment type for easy reference by the seasoned editorial staff of CQ:

- Complete product descriptions.
- Technical specifications.
- Retail prices.
- Equipment photographs.

WHO'S WHO IN THE AMATEUR RADIO BUSINESS

It's a Buyer's Guide filled with the kind of support information you've always needed, but couldn't easily get: Dealer listings state-by-state (including branches), names and calls for key personnel, top lines carried, whether or not trade-ins are accepted or on-site repairs are made... and so on.

BUYING TIPS FROM THE EXPERTS

Great articles on the in's and out's of purchasing Amateur equipment. The experts give you the inside scoop on everything from

antennas to transceivers to making your first packet contact... and lots more.

ORDER YOUR BUYER'S GUIDE TODAY!

Don't miss the single most valuable buying guide in the Amateur Radio field. Send only \$3.95 today.

YES, please send my copy of AMATEUR RADIO BUYER'S GUIDE 1989 for only \$3.95 postage paid.

Date _____ Number of Copies _____

Name _____ Call _____

Address _____

City _____ State _____ Zip _____

☐ Check ☐ MasterCard ☐ VISA

Card No. _____ Expires _____

Signature _____
(Signature required on all charge orders)

Mail to: CQ Communications, Inc.
76 North Broadway, Hicksville, NY 11801

MT

The Return of the Comandante

The good news for clandestine monitors is that the Legend is back! In the early 1980s, anti-Castro broadcaster Comandante David (pronounced, "dah VEED") had a large audience. Not only did clandestine enthusiasts tune in his impassioned transmissions, he was said to be the most popular broadcaster as far as Cuban listeners were concerned. He is credited with inspiring a number of acts of sabotage against the Castro regime, and some feel that he was at least indirectly responsible for what turned into the 1980 exodus from the port of Mariel to the United States.

The Comandante later ran into some problems with the FCC, although the man they eventually charged with illegal broadcasting was not he. In any case, Comandante David disappeared, only to surface on the airwaves very briefly a few years ago. Now he appears to be back for an extended effort. If you missed him before, make certain you catch him this time. If you heard him in the past, you will discover the old fire and spirit are still there.

The Comandante is attempting to maintain a regular schedule of Monday-Wednesday-Friday transmissions at 9:00 p.m. Eastern Time (Tuesday-Thursday-Saturday 0100 UTC). Saturday morning transmissions at 9:00 a.m. (1300 UTC) are also supposed to be coming. The frequency is 7050, although you will find this varying somewhat. Broadcasts normally last for about half an hour. The station identifies as Radio Libertad Cubana and Radio Felipe de la Cruz. It is not unusual to hear the Comandante before and after a broadcast conversing with various contacts and sometimes sending encrypted messages.

Just listen and enjoy this one. Forget about attempting to verify it. For very good reasons the Comandante does not disclose his real identity nor provide a mailing address. Hopefully, someday his entire story can be told. It is a fascinating one, but for now it must remain part of the mystery that surrounds a man who became a broadcasting legend in his own time. And Comandante David, wherever you are, welcome back. Your fans salute you!

Voice CW!

An anonymous Florida reader has sent us

information on one of the most bizarre transmissions we have ever run across. Would you believe voice CW? That is what our contributor heard on 13377.4 kHz in USB at 2100 UTC. The speaker is a man, and the traffic is encrypted in five-letter groups. Why someone would use such an unorthodox communication method and for what purpose both our contributor and this writer would like to know. If you have any information or theories please contact Box 1116.

This same reader also sent along information on a transmission monitored at 2315 on 11130 kHz. Background noise made most of the Spanish unintelligible, but the extensive amount of whistling to alert whomever was to receive the messages is rather typical of smuggling operations. Again, if you can provide any help, let us know.

The Mark of the Beast?

Not really, but you may find the general vicinity of 6666 kHz a good place to do some monitoring. What may possibly be a Contra network can sometimes be heard in Spanish there. A good time to try is around 0100 UTC, but you may come across it at other times as well. Transmissions are in USB.

And while you are in that neighborhood, an anonymous Maryland reader suggests you

listen for anti-Castro La Voz de Alpha 66 which he is hearing exactly on 6666.6 with what he suspects is a brand new transmitter. Strangely enough, Alpha 66 and Comandante David maintain the same evening schedule. Is there some competition going on here?

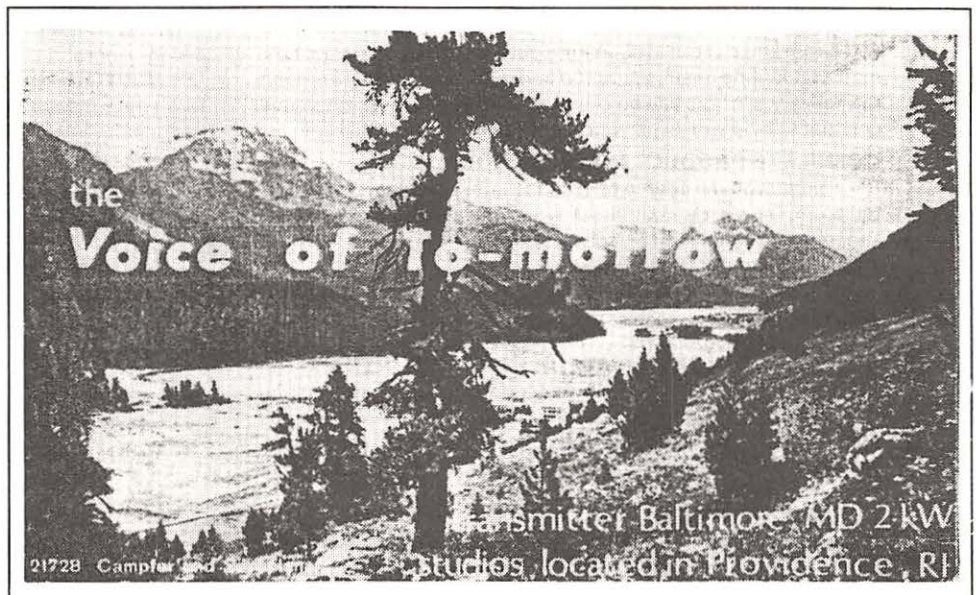
Those Pirates

Yes, folks, pirates are being heard these days. From New York, Cathy Turner reports Radio Clandestine on 7415 kHz from 0315 to 0405 with a program of music and comedy. This is a classic pirate which has been around for over ten years. On 7410 at 2330 she heard the Voice of Tomorrow with its usual white supremacist philosophy.

Now what are the rest of you hearing? Send those pirate logs and other pirate information to Box 1116!

Across the Pond

Yes, we do get read in Europe, and it was great to hear recently from two European readers. From Ireland, Derek Lynch reports that despite an apparent easing of the long-standing tension between Col. Muammar Qaddafi's Libya and Chad, he still hears intense Libyan jamming of Chad's government station on 4904.5. Several months ago Chad's army seriously



embarrassed Qaddafi with several surprising and impressive victories over his forces.

From the Netherlands, Ary Boender brings us an update on Radio Caroline. He reports that Caroline has leased its shortwave facilities to World Mission Radio, P.O. Box 3416, Corona, CA 91719. They relay programs of various religious broadcasters. You may want to try for their transmissions on 6210 or 6215. However, Ary says to expect jamming from French and Danish naval stations, as this has happened in the past.

Caroline's regular music programming continues on 558 medium wave from 0500 to 0100 UTC. The 819 kHz transmitter went off the air in December but is expected to return soon. This is leased to the Dutch service known as Radio Monique, which will probably return as Radio 819.

Ary has over 100 cassettes of the offshore pirates from the early 1960s to the present. He will send you a list of what is available for two IRCs. His address is Ary Beonder, Lobeliastraat 33B, 3202 HR Spykenisse, The Netherlands.

Missing Person

Bob Love, please write me again! I lost your address.

Other News

Costa Rican Radio for Peace International writes that they have raised their power to 7000 watts. Their schedule is now 13660, 1800 to 2100 UTC (a test broadcast); 13660, 2100 to 0000; and 7375, 0100 to 0400 UTC. While not a clandestine broadcaster, clandestine monitors may find much of its programming interesting, and most of it is in English. Reports can be sent to P.O. Box 188, Sweet Home, OR 97386.

We have received several mailings recently from the Free Angola Information Service, which is the American arm of UNITA. UNITA maintains an army which opposes the Marxist government of Angola. UNITA appears to have some hope that under joint American-Soviet backing a settlement to the long, bloody civil war may be reached.

If peace should break out, then UNITA's clandestine Voice of the Resistance of the Black Cockerel may have served its purpose and become part of clandestine history. In the meantime you can still hear its Portuguese broadcasts. Probably the best place and time to try is 4972 kHz around 0330 UTC. The interval signal is a very distinctive rooster crow.

The Free Angola Information Service publishes an informative newsletter, KWACHA NEWS, and on rare occasions will verify taped reception reports. You can reach them at P.O. Box 66463, Washington, DC 20035-5463.

That's it for this month. Thanks for your excellent support.



ADVANCED -SEEKER-tm



-SEEKER-tm The complete system which makes your Commodore computer and ICOM R-71 a sophisticated monitoring station. EASY to use . . . UNEQUALED in performance.

A FEW OF SEEKER'stm FEATURES:

NEW "VCR-like" program recording. You choose day, time and frequencies.

INSTANTLY DISPLAYS broadcaster time and frequency schedules.

UNATTENDED recorder control in six scanning modes.

ADVANCED FEATURES explained in our FREE literature.

STORES, DESCRIBES, PRINTS, and SCANS hundreds of frequencies.

SELECTS the strongest signal from multiple alternate frequencies.

Send for **FREE** brochure or include \$15 (refunded on purchase) for demo disk and Owner's Manuals, to . . .

AF SYSTEMS
Post Office Box 9145-G
Waukegan, Illinois 60079-9145
United States of America

RADIO DIFFUSION NATIONALE
TCHADIANNE
B.P. 692 N'Djaména Tchad

G. S. L.

C'est avec un grand plaisir que nous avons accusé réception de votre rapport d'écoute du 25/5/1984 de l'AFS. votre rapport est conforme à nos programmes. Nous vous en remercions. Notre souhait, c'est de vous compter toujours parmi nos fidèles auditeurs.

A cette fin, nous vous communiquons les horaires et les fréquences de notre émetteur de 100 Kw O.C.

Lundi à	Vendredi
Matinée de 06h30 à 08h30	Sur les 4904, 5Khz
Soirée de 19h30 à 21h30	dans les 60 m
	sur 7 120 Khz dans les 41 m

Samadi	
Matinée de 06h30 à 08h30	Sur les 4904, 5Khz
Soirée de 19h30 à 21h30	dans les 60 m
	dans les 41 m

Dimanche	
Matinée de 06h30 à 08h30	Sur 4904, 5Khz
Soirée de 19h30 à 21h30	dans les 60 m
	dans les 41 m

Langues utilisées : Français, Arabe, Sara, Kanembou,oundang, Toupouri, Gorane, Jassa Zakaou

Salutations cordiales

Le Directeur des Services Techniques
de l'Information

D.NRHET OU ALB.DUT



Going the Distance

A lot of things happen about this time of year. Apples get ripe; footballs are more common than baseballs, and conditions start looking better for low frequency radio listening. If you are a newcomer to the low frequencies, you're just in time for the wonderful season ahead. The thunderstorms of summer and their accompanying static are becoming history and the low frequencies are becoming clear once more. From now until late next spring there will be opportunities to do some great DXing.

Listening on the low end of the radio frequencies requires a little change in thinking about distance. High frequency DXing includes stations from all over the world. We think nothing of hearing Africa, Asia or Australia. Our thrills come from hearing a station on some obscure little island somewhere in the middle of an ocean. Distances aren't that easy to come by in the low frequencies.

Directional Frequencies

Low frequency signals are very directional. And the skip distances aren't as great as they may be for higher frequencies. Add to that the fact that many transmitters, such as those for aeronautical and marine beacons, are not usually that powerful. When all of

these are combined, it is apparent that long distance reception is not something achieved automatically.

The European and African broadcast stations below 300 kHz are heard occasionally along the East Coast. But these transmitters are generally 500,000 to 1 million kilowatts strong. On high frequency, a 2 million kilowatt station would sound like your local AM broadcast station. Even with this kind of power, they don't penetrate far into the U.S. A midwest reception would be a plum for anyone.

Distance not Practical

I am not aware of any African or European beacons reported from the United States. To the best of my knowledge, the beacons furthest east that have been reported are the Azores and Ascension Island. These were heard by a couple of the best DXers in the low frequencies.

This doesn't say that distance reception can't occur. A French Polynesian beacon has been heard in the east and Easter Island in the midwest. This reflects a phenomenon of low frequency. Distance reception is better along north/south lines than east/west. It would probably take a scientist to explain why this works in this manner, but it does seem to be so. The distances for the French Polynesian and Easter Island beacons is about 5,000 miles. On an east/west basis, this should produce some reception of European beacons in this country.

What can one expect in terms of distance? During the daytime, a 25 watt beacon can probably be heard about 300-400 miles maximum. At night, the maximum distance increases to about 1000 miles or so. When a beacon is heard from a distance somewhat greater than this, there is suspicion that the power is more than 25 watts.

As power goes up, so does the distance the beacon can be heard. The French Polynesian beacon is 5000 watts and the Easter Island one is 3000. A beacon of 400-500 watts can reach out a couple of thousand miles and at 1000 watts it can be heard as far away as 3000 or more miles away.

The limitation of distance is also seen in the marine band segment of low frequency. Scan the frequencies from 435 to 500 kHz and you will hear various coastal stations transmitting. But, unlike the other marine bands, you will not find the whole world available at various times of the day. Day or night, the stations will remain the same ones; you will hear U.S., Canadian, Mexican, Cuban and other nearby locations.

Every coastal station monitors and uses 500 kHz. This is the frequency for making preliminary announcements of traffic lists, initial contact for working frequency selection upon occasion, and emergency calls. If long range reception were the normal result, this frequency would quickly become cluttered and unusable. Perhaps this is the reason that the universal frequency was originally selected in the low frequency portion of the spectrum.

Not Necessarily Dull

The lack of distance does not mean that DXing need be dull or boring. There can be a thrill of accomplishment in hearing a beacon from Idaho while you are in Illinois, or a Delaware DXer catching a Texas beacon. No matter where you are located, your chances of hearing 48 states (Alaska and Hawaii are like different countries) are almost impossible. Yet, maybe someday, someone will do it.

A DXer in California, with 3,000 and 4,000 foot antennas hears Australian and New Zealand beacons in modest quantity at certain times of the year. He has also heard beacons well across the country. Another, in Hawaii, hears many U.S. and Canadian beacons well inland from the coast. As equipment and techniques improve, the DXer's equivalent of Worked All States may yet come to pass.

The season is just about starting. Join in and give it a try. You just might be the one to finally accomplish the feat of hearing beacons from all of the states.

INTRODUCING HIGH PERFORMANCE MONITOR, AMATEUR & CB RADIO PRODUCTS

LUNAR INDUSTRIES, INC., is a manufacturer of amateur, commercial and Hobby Radio products which include solid-state linear power amplifiers and super low noise GaAs FET preamplifiers for 50 MHz, 144 MHz, 220 MHz, 440 MHz and 800-1200 MHz. Commercial models of the power amps and preamps are available for the Public Service and Land Mobile bands. Our GaAs FET preamplifiers are great for Scanner Enthusiasts! We also offer a HOT 10-dB Gain, 1-dB NF, JFET "in-line" preamplifier for Citizens Band transceivers. For more detailed information, please contact:

LUNAR
INDUSTRIES, INC.
COMMUNICATIONS & SYSTEMS DIVISION

8353 ACTIVITY RD., STE. 1 ■ SAN DIEGO, CA 92128
TELEPHONE (619) 548-9555 ■ TELEX 181747



Walk Tall and Carry a Little 'Bear'

Grove has super deals on Bearcat's exciting new handhelds, with more memory channels and wider range than ever before!

Bearcat BC200XLT

New!

Finally, a high performance handheld programmable scanner which includes aircraft and all land mobile bands, including 800 MHz!

Frequency coverage is 29-54, 118-174, 406-512, and 806-960 MHz (less cellular frequencies, which we can restore for \$10 at time of order). 200 memory channels may be stored in 10 banks of 20 channels each or scanned sequentially.

This feature-packed handful offers ten priority channels, search, lockout, and delay and comes equipped with detachable Nicad battery pack, AC charger, leather holster, and BNC flex whip.

The BC200XLT is the most powerful hand-held scanner ever released to the public and is now available from Grove Enterprises at a super discount price!

CALL TOLL-FREE (MC & Visa Only)
1-800-438-8155

Extra BP200 battery packs available - 35.00

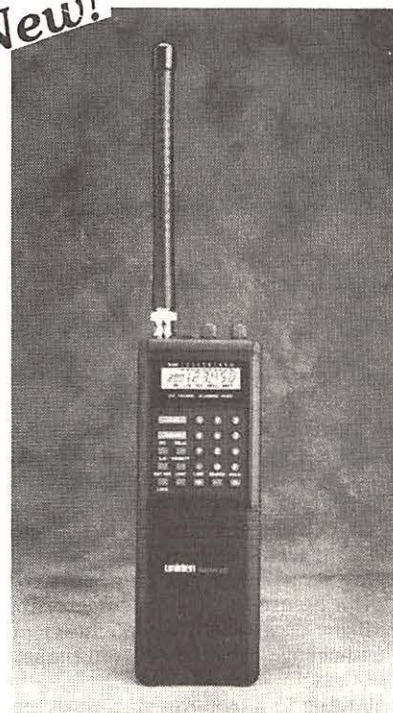
Order SCN9

Grove Discount Price

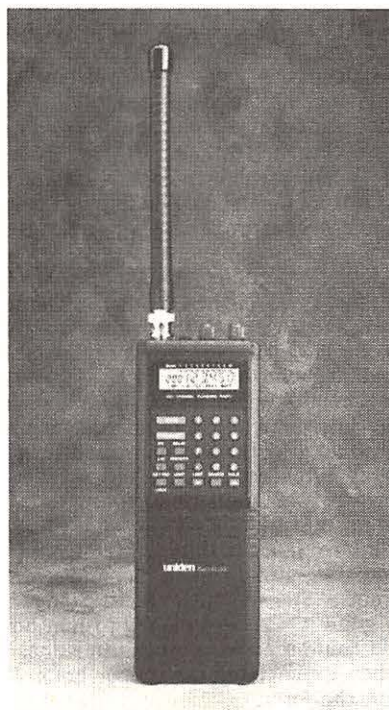
Retail
~~\$449.95~~

\$279⁰⁰

*5 UPS Shipping
*10 U.S. Mail P.P.; *15 Canada Air P.P.



Features may vary slightly from photo



The Bearcat BC100XLT

Introducing the **BC-100XLT**, with 100 memory channels! Yes, the all-time popular Bearcat hand-held programmable scanner has aircraft reception, 100 channel memory, illuminated LCD display for night viewing, search, rapid scan (15 channels per second), direct channel access, lockout, delay, low battery indicator, priority, and keyboard lock.

Frequency coverage is 29-54, 118-174, 406-512 MHz. Accessories included: Rubber ducky antenna (with BNC base), AC adaptor/charger, Nicad batteries, earphone, and carrying case.

Handsome black case with white chrome accents.
Dimensions: 7½"H x 2¾"W x 1¾"D; Weight: 2 lbs., 10 oz.

Order SCN10

Retail ~~\$349.95~~

Now Only

\$219⁹⁵

CALL TOLL-FREE (MC & Visa Only)
1-800-438-8155

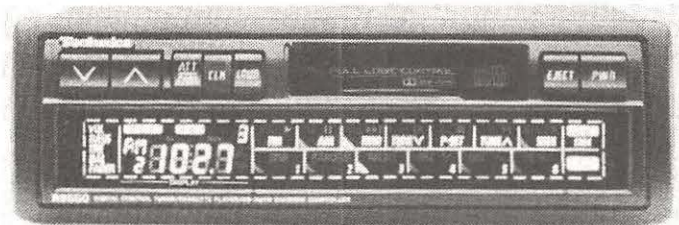
*3 UPS Shipping
*5 U.S. Mail P.P.; *8 Canada Air P.P.

Grove Enterprises

140 Dog Branch Road
Brasstown, N.C. 28902

MC and Visa Orders Only,
Call 1-800-438-8155

... In which Technics taps, Midland takes sides, young Grove turns to the light side of the force, and the editor gets even ...



Technics taps . . .

Technics car audio recently introduced a stereo incorporating a technology that could someday be used in world band receivers, scanners, and other monitoring equipment.

The new Technics CQ-R9550 practically doesn't have any "real" buttons. Instead, it has a touch sensitive LCD face which serves as the control and display panel. Tap the face plate, and it changes to control a digital AM/FM tuner, a full-logic cassette player, or an optional 12-disc CD changer. As each new control face is displayed, the appropriate set of control functions is activated.

This changeable control-and-display panel idea could be pretty interesting on some of the more complicated world band radios. It might even be used to reduce some of the crowding of controls that Larry Magne occasionally complains about. On the other hand, if this touch-and-change capability ever misbehaves, it could make the entire radio useless.

In addition to its innovative control set-up, which includes a palm-size wireless remote control, the Technics CQ-R9550 has all the bells and whistles that you would expect to find on a top quality car stereo, including, of all things, the ability to control the CX-DP11, a 12-disc CD changer with random-access programming. So don't think of your wheels as transportation, think of it as a rolling jukebox! Suggested retail on the CQ-R9550 is \$750; the CX-DP11 is \$850.



Midland takes sides (bands) . . .

Midland International has introduced a new "professional class" single sideband /AM mobile CB transceiver. The Model 79-265 features 40 channels AM, plus upper and lower sideband with 12 watts PEP output. There's a three-way solid state bar graph "S"/RF/SWR meter; noise blanker and ANL; a crystal filter to reduce adjacent channel interference; an amber digital channel readout; and instant channel 9 access, among other goodies.

Perhaps most interesting on the Model 79-265 is an aluminum FIN heat sink, which Midland rightly claims is usually found only on commercial two-way radios. It's supposed to extend the life of the RF

output transistors and allow maximum power output by providing superior heat dissipation. Maybe so — I've never really found heat buildup to be much of a problem in my sidebanders. But if you get inside the radio and crank up the wattage, maybe then it makes more of a difference...but MT readers wouldn't do that, would they? Nah.

Suggested retail on the Model 79-265 is \$289.95. If you want to know more about this new rig, contact Midland International, Consumer Communications Division, 1690 North Topping, Kansas City, MO 64120.

Young Grove turns to the light side of the force . . .

Bill Grove, son of MT publisher Bob Grove, is a self-confessed computer addict whose formative years have been influenced by video games. Certain that a laser in his hands would bring the warlords of the world to their knees — or at least command respect from the senior class at high school — Bill started on his technical odyssey. Although unable to achieve global peace, Bill did make some fascinating discoveries while building and testing his new Heathkit laser.

Herewith his report:

For several months I had been trying to convince my father that we needed a laser. "What do you want with a laser?" he asked. "I've always wanted one," I replied. I had, indeed, been dreaming of getting a laser and then I saw the one in the Heathkit catalog. The kit included a laser, a receiver and an entire instructional course! It was perfect.

Finally my dad agreed. He also agreed that it might make an interesting topic for review in MT. After what seemed like an eternity (actually, about two weeks), there it was: a big box from Heathkit! I tore open the carton to find several boxes which didn't look like a laser, but the instruction manual reassured me that there really was a way to stick all these little parts together to make one.

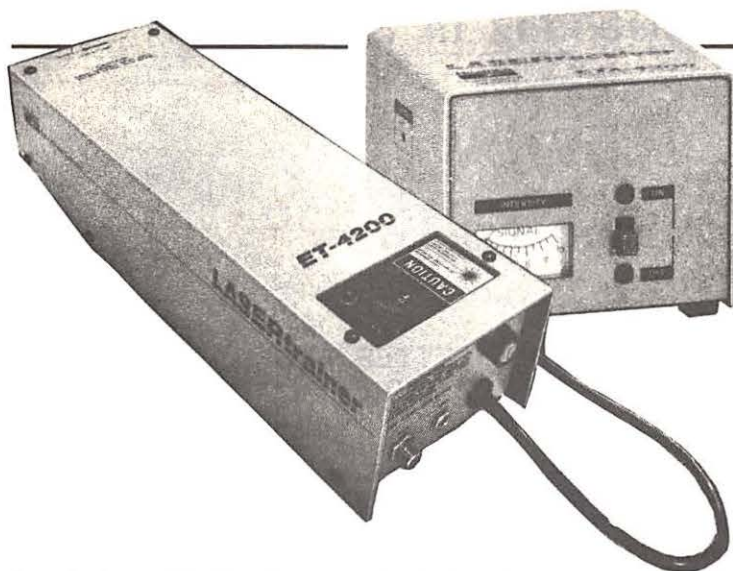
I ran upstairs to the lab, sat down and plugged in a soldering iron. I was ready. "This is only a class 2 Heathkit," (intermediate difficulty level) I assured myself (I had previously built a class 3 frequency counter). Opening the construction manual and finding the same easy-to-follow instructions I had encountered with my previous project, I began.

After six hours of soldering, poking, bending, and using some words my dad had taught me, I was finished. With eager anticipation, I plugged it in, turned it on...and it worked! It was beautiful. A brilliant, ruby-red dot shown on the lab wall. No one can quite describe the feeling you get from building one of these kits.

After a few final adjustments — again, all easy-to-follow steps in the manual — I plugged the laser into the wall socket once again and turned it on for my dad to admire. He was impressed. I explained to him how I could adjust its output between .4 and .9 milliwatts. The laser receiver would have to wait until tomorrow.

The next day I called my best friend and told what I had built. His first words were, "Does it burn holes in things?" Although I found his knowledge of lasers stimulating, I interrupted him and said, "No. This laser is for education, not a Star Wars' project!" Somewhat disappointed, he asked what good it was. I explained to him how when I completed the receiver, I could send wireless transmissions from one place to another and when I completed the trainer book, I could do various experiments with the laser.

That afternoon I started to assemble the receiver. Since it was much smaller than the laser, I expected it to be much simpler to construct; however, because the box is so small, I had difficulty getting



into the box to install the batteries. Aside from that, the assembly went smoothly and in under three hours I was finished and ready to test the whole system.

The receiver comes with all the necessary cords to plug it into an auxiliary audio source. I chose to connect it to my "boom box." I installed a cassette, turned on the laser and pointed the beam into the receiver across the room. Sure enough, the Top Gun Anthem bounded from the speaker! It was incredible.

That night I decided to give the system a real test. With the laser plugged into the house wall socket, I took the portable receiver about 100 feet into the yard. I followed the tell-tale dot from the laser beam which fell on a nearby tree and thrust the receiver into the path of the beam. Immediately, sound from the cassette rushed from the speaker.

For Instructions

About a week later the EB-10 Laser Technology Course arrived in the mail. This, too, was fascinating to assemble, follow and use. It had mirrors, lenses, an optical fiber, polarizers, filters and professionally written course materials on lasers, theory and experiments.

Since lasers are used in surgery, industrial processes, consumer labeling, optical encoding and reading, distance measuring and telecommunications, appropriate instructional materials are mandatory. The course includes a student workbook with 15 laboratory experiments covering laser transmission and modulation; an accompanying instructor's guide provides course objectives and outlines, chapter tests with answer keys, and a final exam.

The chapters in the course cover every conceivable area of laser technology and practice, including the nature of light, laser design, applications and laser safety. A prerequisite of basic algebra and electronics is recommended.

For anyone who has an interest in lasers, especially schools and technical training institutions, the kits are easy to assemble, fun and highly instructional. For those who aren't talented in the art of soldering, or simply haven't the time to build a kit, the laser and receiver are also available factory wired at additional cost.

Technical Specifications:

Output power	0.4 mW to 0.9 mW
Wavelength	632.8 nm (visible red)
Beam diameter	0.49 mm at 1/ePTS .49 mm.
Beam divergence	1.64 mrad.
Polarization	Random
DHHS Class	II
Modulation bandwidth	300 Hz to 40 kHz +/- 3 dB
Auxiliary input	1 volt, peak-to-peak
Microphone input	100 mV for 50 k ohm crystal mike
Power requirements	120 VAC, 60 Hz, 15 watts
Dimensions (laser)	3-1/4"H x 3-3/4"W x 13-7/8"L
Net weight	2.6 lbs.

Some Final Thoughts

Heathkit's quality in packaging their kits is recognized by kit

builders everywhere. The instruction manual is undisputed when it comes to ease of reading and following directions. The parts and accessories are separately packaged according to their order of use in the assembly manual. All delicate components (like the laser tube) are wrapped in foam rubber.

The instruction manual provides everything the newcomer to kit building needs to know -- how to identify the parts, solder, bend resistor leads -- for successful assembly. The thoughtful touches which pervade the ETS-4200 laser trainer kit and matching EE-110 instructional course punctuate the reputation for quality that the name "Heathkit" has earned.

ETS-4200 laser trainer kit, \$279.95 plus shipping; EE-110 laser technology course, \$99.95 plus shipping; combined discount cost, \$349.90 plus shipping. From Heath Company, P.O. Box 1288, Benton Harbor, MI 49022.

Meanwhile on another side of the galaxy . . .

The editor gets even

Did you ever get behind a driver who seemed to think that going as fast as the speed limit was some sort of sin? Or how about the fellow who demonstrates total ignorance of the function and use of turn signals? Or the woman who continues to apply makeup long after the light has turned green?

If these things get you just a little steamed, you're not alone. They get to me, too, and my wife was becoming mildly concerned about my vocabulary in such circumstances. So, on Father's Day she gave me a perfect present -- The Revenger. Now I don't get mad, I get even!

The Revenger resembles a radar detector in size and shape. Just like a detector, it can be attached to the dash of your car with velcro. But there, my friends (and beware, my foes!), the resemblance ends, for on the faceplate of the revenger there are push-button controls labeled "death ray," "front machine gun," and "grenade launcher."

Flick the toggle switch on the front of the Revenger, and red, yellow and green lights flash, indicating the weapons systems are armed. Press any of the weapons buttons, and the Revenger makes the appropriate noise: an eerie wail for the death ray, a staccato chatter for the machine gun, and a sound like a bomb dropping and exploding for the grenade launcher. And that's all the Revenger does: it makes weapons noises.

Ah, but what satisfaction! To lob an imaginary audio grenade at the lady fixing her hair while holding up a line of traffic; to machine gun with sound effects the guy who doesn't bother with turn signals; to direct the death ray at the slowpoke (when I'm already late) does me a world of good. It relieves my hostility and does no one else harm (there is even a warning on the side of the package: for fun use only, Do not connect to live weapons). In short, it's fun. And my vocabulary is now rated "PG". About the only thing the Revenger lacks is an indicator for "Missile Lock-on." Just call me "Top Gun."

The Revenger is available in many department stores and is distributed by Express Yourself, Inc., Charlotte, NC. Price: less than \$20.

A FINAL NOTE

This column is intended to be fun and informative, and you can help. If you have a favorite gadget, a product you hate, something unusual, or anything else to report in the area of Consumer Electronics, please let me know about it by writing to me c/o *Monitoring Times*.



Program Review

DX Shows and Alistair Cooke

COMMUNICATOR - ****

DX programs today fall into two distinct categories. Some are mere recitations of times, frequencies, and stations. Others concentrate on features and ignore breaking DX news. Programs which break these molds and present a mix of the two genres are generally excellent, and *Communicator* is no exception.

Communicator offers something for everyone. One recent episode had a feature on small satellites, Indonesian and Central American news, a review of the Sony ICF-SW1, and the propagation forecast. All parts of this episode were done well. Even though the ICF-SW1 has been reviewed and re-reviewed by many, this particular report was insightful.

Roger Broadbent, the host, ties the various parts of the program together well. Mike Bird, the presenter of the propagation forecast on *Communicator* and Radio Netherlands' *Media Network*, is arguably one of the foremost experts on shortwave propagation, and his reports are helpful to everyday DXing.

Communicator does not seem to be trying to compete with any of the other DX shows on the air today. Instead, it has carved a unique niche in the field quite nicely.

(Radio Australia, weekly, Sun 0230 rep 0730, 1230, 1730, 2030.)

DX PARTY LINE - **

HCJB's *DX Party Line* has a long tradition. Hosted by Clayton Howard for many years, it was once one of the most popular shows on the air. Alas, the show has fallen on hard times of late.

The producers of *DX Party Line* have sixty minutes per week to fill -- a burdensome task. Unfortunately, much of the material aired could best be called filler. Station profiles are nothing but rehashes of material which could be found in the World almanac and *Passport to World Band Radio*. Reports from clubs and organizations present news which is often stale by airtime ... and the information is useless if you receive the club bulletins.

Even if you don't, most of the good points in the club reports can be found in your current *Monitoring Times*. Also, the station insists on promoting its religious views in a two or three minute spot entitled "Tip for Real Living." Some listeners may find this offensive. It's hard to find reasoning behind HCJB's decision to run the spot. People tune to religious programming in order to hear religion, not DX shows!

This is not to say that there are no good aspects of *DX Party Line*. BBC Monitoring Service information is often useful. And the presenters' friendly style is a definite plus -- something which is often lacking from DX shows today.

There are many fine DX shows for listeners to choose from: Radio Australia's *Communicator*, Radio Netherlands' *Media Network*, and Glenn Hauser's *World of Radio*. *DX Party Line* does not fall into that group. But if you've never heard the show for yourself, it may be worth your time.

(HCJB, twice weekly; Mon 0930 rep 2130, Tue 0230, 0630; Sat 0930 rep 2130, Sun 0230, 0630.)

LETTER FROM AMERICA - *****

Alistair Cooke. The name conjures up visions of *Masterpiece Theatre* (and assorted documentaries on American history as well) to devoted public television watchers. But the expatriate Briton has his own spot on BBC World Service as well.

Letter from America has intrigued listeners for its long run. Cooke skillfully presents insightful commentary on events in the United States.

He also comments on American idiosyncrasies. This is fascinating, especially for those of us here who don't often notice such things. Things which seem trivial to us are Cooke's fuel. He examines motives and analyzes extremely well.

The host carefully avoids throwing in his own opinion on political or social issues; it is his shrewd ability to observe which differentiates his program from others of the same type. This ability makes for a delightful thirteen minutes of listening.

(BBC World Service, weekly; Sat 1015 rep Sun 0545, 1645, 2315.)

If you have comments on a particular program which you've heard on shortwave, we invite you to send them to the program reviewer at the address on page 59. Full reviews are welcome, and should be approximately 150 to 100 words long.

Kannon Shanmugam

Your Guide to Shortwave Listening in September

How to Use This Section

This is your daily guide to the programs being broadcast on the international bands. Wherever possible, actual advance program details for the listed stations are included. To use this section, simply look up the day on which you are listening, check the time, and decide which program interests you. Then go to the frequency section in order to locate the frequency of the station/ program on the dial.

All days are in UTC. Keep in mind that the new UTC day begins at 0000 UTC. Therefore, if you are listening to the shortwave at 8:01 PM [EDT] on your local Thursday night, that's equal to 0001 UTC and therefore *Friday* UTC.

We invite readers to submit information and reviews about their favorite programs. These must be in UTC day and time and can be sent to program manager Kannon Shanmugam.

We also invite broadcast stations to submit advance program details for publication in *Monitoring Times*. Copy deadline is the 1st of the month preceding publication [i.e. details for programs to be broadcast in October must be received by Kannon Shanmugam by September 1st. Information can be FAXed via 1-704-837-2216 and should indicate clearly that it is to be submitted to the *Monitoring Times* program guide.

Program Manager:
Kannon Shanmugam
4412 Turnberry Drive
Lawrence, KS 66046

Key to Program Ratings:

- ***** - outstanding
- **** - excellent
- *** - good
- ** - fair
- * - don't waste your time

AFRTS - (US) Armed Forces Radio & TV
BBC - BBC, London, England
HCJB - HCJB, Quito, Ecuador
RA - Radio Australia, Melbourne
RCI - Radio Canada Int'l, Montreal
RJ - Radio Japan, Tokyo
RNI - Radio Norway Int'l, Oslo
VOFC - Voice of Free China, Taiwan
WCSN - WCSN, Boston, Massachusetts

Sunday

4th, 11th, 18th, 25th

0000 BBC: World News
0000 RA: International Report

0009 BBC: News About Britain
0015 BBC: Radio Newsreel
0030 RA: Anything Goes (music)
0100 BBC: News Summary
0100 RA: World and Australian News
0101 BBC: Play of the Week
0113 RA: Boomerang (letters)
0130 RA: At Your Request
0200 BBC: World News
0200 RA: International Report
0209 BBC: British Press Review
0215 BBC: The Third Policeman (reading) [ex 25th]
0230 BBC: The Ken Bruce Show (music mix and entertainment news)
0230 HCJB: DX Party Line (SW radio)
0230 RA: Communicator (SW radio)
0230 VOFC: Mailbag Time (letters)
0300 BBC: World News
0300 RA: World and Australian News
0309 BBC: News About Britain
0313 RA: Music of RA
0315 BBC: From Our Own Correspondent - **** - Good in-depth news stories.
0330 BBC: Trivia Test Match (quiz show)
0400 BBC: Newsdesk
0430 BBC: English Songsmiths
0445 BBC: Reflections (religion)
0450 BBC: Financial Review
0500 BBC: World News
0509 BBC: Twenty-Four Hours (news magazine)
0530 AFRTS: The Source Report
0545 BBC: Letter from America
0600 BBC: Newsdesk
0630 BBC: Five Faces of Jazz
0700 BBC: World News
0709 BBC: Twenty-Four Hours (news magazine)
0730 BBC: From Our Own Correspondent - **** (see Sun 0315)
0745 BBC: Words
0750 BBC: Waveguide - ** - DX program geared toward neophyte listeners.
0800 BBC: World News
0800 RA: International Report
0809 BBC: Reflections (religion)
0815 BBC: The Pleasure's Yours (classical music requests)
0830 RA: Sports Results
0845 RA: Music of RA
0900 BBC: World News
0900 RA: World and Australian News
0909 BBC: British Press Review
0913 RA: Book Readings
0915 BBC: Science In Action
0925 Radio Japan: DX Corner
0930 RA: Music Special
0945 BBC: Whither Wisdom?
1000 BBC: News Summary
1000 RA: International Report
1000 Radio Norway International: Norway Today
1001 BBC: Short Story
1015 BBC: Classical Record Review

1030 BBC: Religious Service
1030 RA: Bicentennial Feature
1100 BBC: World News
1100 RA: World and Australian News
1109 BBC: News About Britain
1113 RA: Music of RA
1115 BBC: From Our Own Correspondent - **** (see Sun 0315)
1130 RA: International Top Hits
1200 BBC: News Summary
1200 RA: International Report
1201 BBC: Play of the Week
1230 RA: Communicator (SW radio)
1300 BBC: World News
1300 RA: World and Australian News
1300 Radio Canada International: Sunday Morning
1300 RNI: Norway Today
1309 BBC: Twenty-Four Hours (news magazine)
1313 RA: Smith's Weekly (news features and opinion)
1330 BBC: Sports Roundup
1330 RA: Sports Results
1345 BBC: The Tony Myatt Request Show
1345 RA: Music of RA
1400 BBC: News Summary
1400 RA: International Report
1400 RNI: Norway Today
1401 BBC: The Tony Myatt Request Show, continued
1430 BBC: Trivia Test Match (quiz show)
1430 RA: Innovations
1500 BBC: Radio Newsreel
1525 Radio Japan: DX Corner
1600 BBC: World News
1600 RNI: Norway Today
1609 BBC: News About Britain
1615 BBC: The Cross and the Crescent (feature on the Crusades)
1645 BBC: Letter from America
1700 BBC: World News
1700 RNI: Norway Today
1709 BBC: Commentary
1715 BBC: Five Faces of Jazz
1745 BBC: Sports Roundup
1800 BBC: Newsdesk
1830 BBC: Brain Of Britain 1988 - ***** - Immensely entertaining quiz show.
1900 BBC: News Summary
1900 RNI: Norway Today
1901 BBC: Classical Record Review
2000 BBC: World News
2000 RNI: Norway Today
2009 BBC: Twenty-Four Hours (news magazine)
2030 BBC: Sunday Half-Hour (religious feature)
2100 BBC: News Summary
2101 BBC: Short Story
2115 BBC: The Pleasure's Yours (classical music requests)
2130 RA: International Top Hits
2200 BBC: World News
2200 RNI: Norway Today

Your Guide to Shortwave Listening in September

2209 BBC: The Third Policeman
(reading) [ex 25th]
2225 BBC: Book Choice
2230 BBC: Financial Review
2230 RA: Interaction (exploring
Australia)
2240 BBC: Reflections (religion)
2245 BBC: Sports Roundup
2300 BBC: World News
2300 RA: World and Australian News
2309 BBC: Commentary
2313 RA: Music of RA
2315 BBC: Letter From America
2330 BBC: The Stuarts [ex 25th]
2330 RA: Monitor (science)

Monday

5th, 12th, 19th, 26th

0001 WCSN: News
0006 WCSN: News Focus
0030 WCSN: News
0033 WCSN: Monitor Forum (social
commentary and the arts)
0045 WCSN: Music Program
0101 WCSN: News
0106 WCSN: Letterbox
0115 WCSN: Kaleidoscope (news
features)
0130 WCSN: News
0135 WCSN: Conversations (discussion)
0201 WCSN: News
0206 WCSN: News Focus
0230 WCSN: News
0233 WCSN: Monitor Forum (social
commentary and the arts)
0245 WCSN: Music Program
0301 WCSN: News
0306 WCSN: Letterbox
0315 WCSN: Kaleidoscope (news
features)
0330 WCSN: News
0335 WCSN: Conversations (discussion)
1601 WCSN: News
1606 WCSN: News Focus
1630 WCSN: News
1633 WCSN: Monitor Forum (social
commentary and the arts)
1645 WCSN: Music Program
1701 WCSN: News
1706 WCSN: Letterbox
1715 WCSN: Kaleidoscope (news
features)
1730 WCSN: News
1735 WCSN: Conversations (discussion)
1801 WCSN: News
1806 WCSN: News Focus
1830 WCSN: News
1833 WCSN: Monitor Forum (social
commentary and the arts)
1845 WCSN: Music Program
1901 WCSN: News
1906 WCSN: Letterbox
1915 WCSN: Kaleidoscope (news
features)
1930 WCSN: News
1935 WCSN: Conversations (discussion)
0000 BBC: World News

0000 RA: International Report
0009 BBC: News About Britain
0015 BBC: Radio Newsreel
0030 BBC: Religious Service
0030 RA: Music of RA
0100 BBC: News Summary
0100 RA: World and Australian News
0113 RA: Window on Australia
0125 RJ: DX Corner
0130 RA: This Australia (documentaries)
0200 BBC: World News
0200 RA: International Report
0209 BBC: British Press Review
0215 BBC: Peebles' Choice (music)
0230 BBC: Science in Action
0230 RA: International Country Music
0300 BBC: World News
0300 RA: World and Australian News
0309 BBC: News About Britain
0313 RA: Music of RA
0315 BBC: Good Books - **** -
Detailed opinions on specific
books.
0325 Radio Japan: DX Corner
0330 AFRTS: MonitoRadio (produced by
C.S.M.)
0330 BBC: Anything Goes
0330 BBC: Anything Goes (odd
recordings)
0330 RA: Sports Results
0345 RA: Music of RA
0400 BBC: Newsdesk
0400 RNI: Norway Today
0430 BBC: Where Angels Fear to Tread
(reading) [5th, 12th]
0445 BBC: Reflections (religion)
0450 BBC: Waveguide - ** (see Sun
0750)
0500 BBC: World News
0500 RNI: Norway Today
0509 BBC: Twenty-Four Hours (news
magazine)
0530 BBC: Nature Notebook
0545 BBC: Recording Of The Week
0600 BBC: Newsdesk
0630 BBC: The Stuarts [ex 26th]
0700 BBC: World News
0709 BBC: Twenty-Four Hours (news
magazine)
0730 BBC: The Cross and the Crescent
(feature on the Crusades)
0800 BBC: World News
0800 RA: International Report
0809 BBC: Reflections (religion)
0815 BBC: Where Angels Fear to Tread
(reading) [5th, 12th]
0825 RA: Stock Exchange Report
0827 RA: Propagation Report
0830 BBC: Anything Goes (odd
recordings)
0830 RA: Sports Results
0845 RA: Music of RA
0900 BBC: World News
0900 RA: World and Australian News
0909 BBC: British Press Review
0913 RA: Music of RA
0915 BBC: Good Books - **** (see
Mon 0315)

0930 BBC: Financial News
0930 RA: Innovations
0940 BBC: Sports Roundup
0945 BBC: Peebles' Choice (music)
1000 BBC: News Summary
1000 RA: International Report
1001 BBC: The Stuarts [ex 26th]
1025 RA: Stock Exchange Report
1030 BBC: The Vintage Chart Show
1030 RA: Pacific Sunrise (business in
the Pacific)
1100 BBC: World News
1100 RA: World and Australian News
1109 BBC: News About Britain
1113 RA: Music of RA
1115 BBC: Health Matters
1130 BBC: The Ken Bruce Show (music
mix with entertainment news)
1130 RA: Soundabout (contemporary
music)
1200 BBC: Radio Newsreel
1200 RA: International Report
1215 BBC: Brain Of Britain 1988 -
***** (see Sun 1830)
1225 RA: Propagation Report
1230 RA: Education Issues
1245 BBC: Sports Roundup
1300 BBC: World News
1300 RA: World and Australian News
1309 BBC: Twenty-Four Hours (news
magazine)
1313 RA: Window on Australia
1330 BBC: Anything Goes (odd
recordings)
1330 RA: Sports Results
1345 RA: Music of RA
1400 BBC: World News
1400 RA: International Report
1405 BBC: Outlook
1425 RA: Stock Exchange Report
1430 RA: Music of RA
1445 BBC: The Third Policeman
(reading) [ex 26th]
1500 BBC: Radio Newsreel
1515 BBC: The Stuarts [ex 26th]
1545 BBC: Classical Music Feature
1545 BBC: English Songsmiths
1600 BBC: World News
1609 BBC: News about Britain
1615 BBC: Whither Wisdom?
1645 BBC: The World Today (news
feature)
1700 BBC: World News
1709 BBC: Commentary
1745 BBC: Sports Roundup
1800 BBC: Newsdesk
1830 BBC: Multitrack 1: Top 20 - ****
- Interesting British pop trends
here.
1900 BBC: News Summary
1901 BBC: Outlook
1939 BBC: Stock Market Report
1945 BBC: Peebles' Choice (music)
2000 BBC: World News
2009 BBC: Twenty-Four Hours (news
magazine)
2030 BBC: Sports International (feature)
2100 BBC: News Summary

Your Guide to Shortwave Listening in September

2101 BBC: Network UK (feature)
 2130 BBC: The Vintage Chart Show
 2130 RA: Soundabout (contemporary music)
 2200 BBC: World News
 2209 BBC: The World Today (news feature)
 2230 BBC: Financial News
 2230 RA: Anything Goes (music)
 2240 BBC: Reflections (religion)
 2245 BBC: Sports Roundup
 2300 BBC: World News
 2300 RA: World and Australian News
 2309 BBC: Commentary
 2313 RA: Window on Australia
 2330 BBC: Multitrack 1: Top 20 - **** (see Mon 1830)
 2330 RA: Arts Roundabout

Tuesday

6th, 13th, 20th, 27th

0000 BBC: World News
 0000 RA: International Report
 0001 WCSN: News
 0006 WCSN: News Focus
 0009 BBC: News About Britain
 0015 BBC: Radio Newsreel
 0030 BBC: Classical Music Feature
 0030 RA: Music of RA
 0030 WCSN: News
 0033 WCSN: Monitor Forum (social commentary and the arts)
 0045 WCSN: Music Program
 0100 BBC: News Summary
 0100 RA: World and Australian News
 0101 BBC: Outlook
 0101 WCSN: News
 0106 WCSN: Letterbox
 0113 RA: Window on Australia
 0115 WCSN: Kaleidoscope (news features)
 0130 BBC: Short Story
 0130 RA: Education Issues
 0130 WCSN: News
 0135 WCSN: Young Ideas (program for teenagers)
 0200 BBC: World News
 0200 RA: International Report
 0201 WCSN: News
 0206 WCSN: News Focus
 0209 BBC: British Press Review
 0215 BBC: Network UK (feature)
 0230 BBC: Sports International (feature)
 0230 HCJB: DX Party Line (SW radio)
 0230 RA: On Our Selection (magazine)
 0230 WCSN: News
 0233 WCSN: Monitor Forum (social commentary and the arts)
 0245 WCSN: Music Program
 0300 BBC: World News
 0300 RA: World and Australian News
 0301 WCSN: News
 0306 WCSN: Letterbox
 0309 BBC: News About Britain
 0313 RA: Music of RA
 0315 BBC: The World Today (news feature)

0315 WCSN: Kaleidoscope (news features)
 0330 BBC: John Peel (progressive rock music)
 0330 RA: Sports Results
 0330 WCSN: News
 0335 WCSN: Young Ideas (program for teenagers)
 0345 RA: Music of RA
 0400 BBC: Newsdesk
 0401 WCSN: News
 0406 WCSN: News Focus
 0430 WCSN: News
 0433 WCSN: Monitor Forum (social commentary and the arts)
 0445 BBC: Reflections (religion)
 0445 WCSN: Music Program
 0450 BBC: Financial News
 0500 BBC: World News
 0501 WCSN: News
 0506 WCSN: Letterbox
 0509 BBC: Twenty-Four Hours (news magazine)
 0515 WCSN: Kaleidoscope (news features)
 0530 BBC: New Ideas
 0530 WCSN: News
 0535 WCSN: Young Ideas (program for teenagers)
 0540 BBC: Book Choice
 0545 BBC: The World Today (news feature)
 0600 BBC: Newsdesk
 0700 BBC: World News
 0709 BBC: Twenty-Four Hours (news magazine)
 0745 BBC: Network UK (feature)
 0800 BBC: World News
 0800 RA: International Report
 0809 BBC: Reflections (religion)
 0815 BBC: Health Matters
 0827 RA: Propagation Report
 0830 RA: Sports Results
 0845 RA: Music of RA
 0900 BBC: World News
 0900 RA: World and Australian News
 0909 BBC: British Press Review
 0913 RA: Music of RA
 0915 BBC: The World Today (news feature)
 0930 BBC: Financial News
 0930 RA: Country Australia (agriculture)
 0940 BBC: Sports Roundup
 0945 BBC: English Songsmiths
 0945 RA: Music of RA
 1000 BBC: News Summary
 1000 RA: International Report
 1001 BBC: Discovery (science)
 1030 BBC: Sports International (feature)
 1030 RA: Australian Country Style (local country music)
 1100 BBC: World News
 1100 RA: World and Australian News
 1109 BBC: News About Britain
 1113 RA: Music of RA
 1115 BBC: Waveguide - ** (see Sun 0750)
 1125 BBC: Book Choice

1130 BBC: Citizens - **** - innovative serial with travails of five fictional Britons.
 1130 RA: Soundabout (contemporary music)
 1200 BBC: Radio Newsreel
 1200 RA: International Report
 1215 BBC: Multitrack 1: Top 20 - **** (see Mon 1830)
 1225 RA: Propagation Report
 1230 RA: Bicentennial Feature
 1245 BBC: Sports Roundup
 1300 BBC: World News
 1300 RA: World and Australian News
 1309 BBC: Twenty-Four Hours (news magazine)
 1313 RA: Window on Australia
 1330 BBC: Network UK (feature)
 1330 RA: Sports Results
 1345 BBC: Recording Of The Week
 1345 RA: Music of RA
 1400 BBC: World News
 1400 RA: International Report
 1405 BBC: Outlook
 1430 RA: Music of RA
 1500 BBC: Radio Newsreel
 1515 BBC: A Jolly Good Show (rock music)
 1600 BBC: World News
 1609 BBC: News About Britain
 1615 BBC: Omnibus (topical feature)
 1645 BBC: The World Today (news feature)
 1700 BBC: World News
 1709 BBC: Commentary
 1715 BBC: Citizens - **** (see Tue 1130)
 1745 BBC: Sports Roundup
 1800 BBC: Newsdesk
 1830 BBC: Development '88
 1900 BBC: News Summary
 1901 BBC: Outlook
 1939 BBC: Stock Market Report
 1945 BBC: Report On Religion - **** - News on modern religion.
 2000 BBC: World News
 2009 BBC: Twenty-Four Hours (news magazine)
 2030 BBC: Meridian (arts feature)
 2100 BBC: News Summary
 2130 BBC: The Cross and the Crescent (feature on the Crusades)
 2130 RA: Soundabout (contemporary music)
 2200 BBC: World News
 2209 BBC: The World Today (news feature)
 2225 BBC: Book Choice
 2230 BBC: Financial News
 2230 RA: Just Out (new music releases)
 2240 BBC: Reflections (religion)
 2245 BBC: Sports Roundup
 2300 BBC: World News
 2300 RA: World and Australian News
 2309 BBC: Commentary
 2313 RA: Window on Australia
 2330 RA: Smith's Weekly (news features and opinion)

Your Guide to Shortwave Listening in September

2345 RA: Music of RA

Wednesday

7th, 14th, 21st, 28th

0000 BBC: World News
 0000 RA: International Report
 0009 BBC: News About Britain
 0015 BBC: Radio Newsreel
 0030 BBC: Omnibus (topical feature)
 0030 RA: Music of RA
 0100 BBC: News Summary
 0100 RA: World and Australian News
 0101 BBC: Outlook
 0113 RA: Window on Australia
 0130 BBC: Report On Religion - ****
 (see Tue 1945)
 0130 RA: Bicentennial Feature
 0145 BBC: Country Style - ** - British
 country music?
 0200 BBC: World News
 0200 HCJB: Saludos Amigos (letters)
 0200 RA: International Report
 0209 BBC: British Press Review
 0230 BBC: Citizens - **** (see Tue
 1130)
 0230 RA: Anything Goes (music)
 0300 BBC: World News
 0300 RA: World and Australian News
 0309 BBC: News About Britain
 0313 RA: Music of RA
 0315 BBC: The World Today (news
 feature)
 0330 BBC: Discovery (science)
 0330 RA: Sports Results
 0345 RA: Music of RA
 0400 BBC: Newsdesk
 0445 BBC: Reflections (religion)
 0450 BBC: Financial News
 0500 BBC: World News
 0509 BBC: Twenty-Four Hours (news
 magazine)
 0530 BBC: Report On Religion - ****
 (see Tue 1945)
 0545 BBC: The World Today (news
 feature)
 0600 BBC: Newsdesk
 0630 BBC: Meridian (arts feature)
 0700 BBC: World News
 0709 BBC: Twenty-Four Hours (news
 magazine)
 0730 BBC: Development '88
 0800 BBC: World News
 0800 RA: International Report
 0809 BBC: Reflections (religion)
 0815 BBC: Classical Record Review
 0825 RA: Stock Exchange Report
 0827 RA: Propagation Report
 0830 BBC: Brain Of Britain 1988 -
 ***** (see Sun 1830)
 0830 RA: Sports Results
 0845 RA: Music of RA
 0900 BBC: World News
 0900 RA: World and Australian News
 0909 BBC: British Press Review
 0913 RA: Music of RA
 0915 BBC: The World Today (news
 feature)

0930 BBC: Financial News
 0930 RA: Word of Mouth (oral histories)
 0940 BBC: Sports Roundup
 0945 BBC: Jazz Scene UK [7th, 21st];
 Folk in Britain [14th, 28th]
 0945 RA: Music of RA
 1000 BBC: News Summary
 1000 RA: International Report
 1001 BBC: Omnibus (topical feature)
 1025 RA: Stock Exchange Report
 1030 BBC: Trivia Test Match (quiz
 show)
 1030 RA: At Your Request
 1100 BBC: World News
 1100 RA: World and Australian News
 1109 BBC: News About Britain
 1113 RA: Music of RA
 1130 BBC: Meridian (arts feature)
 1130 RA: Soundabout (contemporary
 music)
 1200 BBC: Radio Newsreel
 1200 RA: International Report
 1215 BBC: Time for Verse
 1225 BBC: The Farming World
 1225 RA: Propagation Report
 1230 RA: Interaction (exploring
 Australia)
 1245 BBC: Sports Roundup
 1300 BBC: World News
 1300 RA: World and Australian News
 1309 BBC: Twenty-Four Hours (news
 magazine)
 1313 RA: Window on Australia
 1330 BBC: Development '88
 1330 RA: Sports Results
 1345 RA: Music of RA
 1400 BBC: World News
 1400 RA: International Report
 1405 BBC: Outlook
 1425 RA: Stock Exchange Report
 1430 RA: Music of RA
 1445 BBC: Report On Religion - ****
 (see Tue 1945)
 1500 BBC: Radio Newsreel
 1600 BBC: World News
 1609 BBC: News About Britain
 1615 BBC: Hitting the High Notes
 1645 BBC: The World Today (news
 feature)
 1700 BBC: World News
 1709 BBC: Commentary
 1715 BBC: Society Today
 1730 BBC: New Ideas
 1740 BBC: Book Choice
 1745 BBC: Sports Roundup
 1800 BBC: Newsdesk
 1830 BBC: Multitrack 2 - *** - Pop
 music and news.
 1900 BBC: News Summary
 1901 BBC: Outlook
 1939 BBC: Stock Market Report
 1945 BBC: Good Books - **** (see
 Mon 0315)
 2000 BBC: World News
 2009 BBC: Twenty-Four Hours (news
 magazine)
 2030 BBC: Churchill the Historian
 2100 BBC: News Summary

2101 BBC: Network UK (feature)
 2115 BBC: Hitting the High Notes
 2130 RA: Soundabout (contemporary
 music)
 2145 BBC: Recording Of The Week
 2200 BBC: World News
 2209 BBC: The World Today (news
 feature)
 2230 BBC: Financial News
 2230 RA: Australian Country Style (local
 country music)
 2240 BBC: Reflections (religion)
 2245 BBC: Sports Roundup
 2300 BBC: World News
 2300 RA: World and Australian News
 2309 BBC: Commentary
 2313 RA: Window on Australia
 2315 BBC: Write On... (letters)
 2330 BBC: Multitrack 2 - *** (see Wed
 1830)
 2330 RA: You Asked For It (listeners'
 questions)
 2345 RA: Music of RA

Thursday

1st, 8th, 15th, 22nd, 29th

0000 BBC: World News
 0000 RA: International Report
 0009 BBC: News About Britain
 0015 BBC: Radio Newsreel
 0030 RA: Music of RA
 0100 BBC: News Summary
 0100 RA: World and Australian News
 0101 BBC: Outlook
 0113 RA: Window on Australia
 0130 BBC: Waveguide - ** (see Sun
 0750)
 0130 RA: Interaction (exploring
 Australia)
 0140 BBC: Book Choice
 0145 BBC: Society Today
 0200 BBC: World News
 0200 RA: International Report
 0209 BBC: British Press Review
 0215 BBC: Network UK (feature)
 0230 BBC: Assignment
 0230 HCJB: Ham Radio Today
 0230 RA: Music of RA
 0300 BBC: The Cross and the Crescent
 (feature on the Crusades)
 0300 BBC: World News
 0300 RA: World and Australian News
 0309 BBC: News About Britain
 0313 RA: Music of RA
 0315 BBC: The World Today (news
 feature)
 0330 RA: Sports Results
 0345 RA: Music of RA
 0400 BBC: Newsdesk
 0430 BBC: Classical Record Review
 0445 BBC: Reflections (religion)
 0450 BBC: Financial News
 0500 BBC: World News
 0509 BBC: Twenty-Four Hours (news
 magazine)
 0530 BBC: Peebles' Choice (music)

Your Guide to Shortwave Listening in September

0545 BBC: The World Today (news feature)
 0600 BBC: Newsdesk
 0630 BBC: Time for Verse
 0640 BBC: The Farming World
 0700 BBC: World News
 0709 BBC: Twenty-Four Hours (news magazine)
 0745 BBC: Network UK (feature)
 0800 BBC: World News
 0800 RA: International Report
 0809 BBC: Reflections (religion)
 0815 BBC: Country Style - ** (see Wed 0145)
 0825 RA: Stock Exchange Report
 0827 RA: Propagation Report
 0830 BBC: John Peel (progressive rock music)
 0830 RA: Sports Results
 0845 RA: Music of RA
 0900 BBC: World News
 0900 RA: World and Australian News
 0909 BBC: British Press Review
 0913 RA: Music of RA
 0915 BBC: The World Today (news feature)
 0930 BBC: Financial News
 0930 RA: Matters of Faith (religion in the Pacific)
 0940 BBC: Sports Roundup
 0945 BBC: Society Today
 0945 RA: Music of RA
 1000 BBC: News Summary
 1000 RA: International Report
 1001 BBC: Churchill the Historian
 1025 RA: Stock Exchange Report
 1030 RA: Music of RA
 1100 BBC: World News
 1100 RA: World and Australian News
 1109 BBC: News About Britain
 1113 RA: Music of RA
 1115 BBC: New Ideas
 1125 BBC: Book Choice
 1130 BBC: Citizens - **** (see Tue 1130)
 1130 RA: Soundabout (contemporary music)
 1200 BBC: Radio Newsreel
 1200 RA: International Report
 1215 BBC: Multitrack 2 - *** (see Wed 1830)
 1225 RA: Propagation Report
 1230 RA: Business Horizons
 1245 BBC: Sports Roundup
 1245 RA: Music of RA
 1300 BBC: World News
 1300 RA: World and Australian News
 1309 BBC: Twenty-Four Hours (news magazine)
 1313 RA: Window on Australia
 1330 BBC: Network UK (feature)
 1330 RA: Sports Results
 1345 BBC: Jazz Scene UK [8th, 22nd]; Folk in Britain [1st, 15th, 29th]
 1345 RA: Music of RA
 1400 BBC: World News
 1400 RA: International Report
 1405 BBC: Outlook

1425 RA: Stock Exchange Report
 1430 RA: Music of RA
 1445 BBC: Write On... (letters)
 1500 BBC: Radio Newsreel
 1515 BBC: The Pleasure's Yours (classical music requests)
 1600 BBC: World News
 1609 BBC: News About Britain
 1615 BBC: Assignment
 1645 BBC: The World Today (news feature)
 1700 BBC: World News
 1709 BBC: Commentary
 1715 BBC: Citizens - **** (see Tue 1130)
 1745 BBC: Sports Roundup
 1800 BBC: Newsdesk
 1830 BBC: Discovery (science)
 1900 BBC: News Summary
 1901 BBC: Outlook
 1945 BBC: Here's Humph!
 2000 BBC: World News
 2009 BBC: Twenty-Four Hours (news magazine)
 2030 BBC: Meridian
 2100 BBC: News Summary
 2101 BBC: Talking From... (Northern Ireland, Scotland, Wales)
 2115 BBC: A Jolly Good Show (rock music)
 2130 RA: Soundabout (contemporary music)
 2200 BBC: World News
 2209 BBC: The World Today (news feature)
 2225 BBC: Book Choice
 2230 BBC: Financial News
 2230 RA: International Country Music
 2240 BBC: Reflections (religion)
 2245 BBC: Sports Roundup
 2300 BBC: World News
 2300 RA: World and Australian News
 2309 BBC: Commentary
 2313 RA: Window on Australia
 2315 BBC: Seven Seas
 2330 BBC: Time for Verse
 2330 RA: Book Readings
 2340 BBC: The Farming World
 2345 RA: Boomerang (letters)

Friday

2nd, 9th, 16th, 23rd, 30th

0000 BBC: World News
 0000 RA: International Report
 0009 BBC: News About Britain
 0015 BBC: Radio Newsreel
 0030 BBC: Music Now (modern classical music)
 0030 RA: Music of RA
 0100 BBC: News Summary
 0100 RA: World and Australian News
 0101 BBC: Outlook
 0113 RA: Window on Australia
 0130 BBC: Jazz Scene UK [9th, 23rd]; Folk in Britain [2nd, 16th, 30th]
 0130 RA: Monitor (science)

0145 BBC: Talking From... (Northern Ireland, Scotland, Wales)
 0200 BBC: World News
 0200 RA: International Report
 0209 BBC: British Press Review
 0215 BBC: Health Matters
 0230 BBC: Citizens - **** (see Tue 1130)
 0230 HCJB: Musical Mailbag
 0230 RA: Music of RA
 0300 BBC: World News
 0300 RA: World and Australian News
 0309 BBC: News About Britain
 0313 RA: Music of RA
 0315 BBC: The World Today (news feature)
 0330 BBC: The Vintage Chart Show
 0330 RA: Sports Results
 0345 RA: Music of RA
 0400 BBC: Newsdesk
 0430 BBC: Country Style - ** (see Wed 0145)
 0445 BBC: Reflections (religion)
 0450 BBC: Financial News
 0500 BBC: World News
 0509 BBC: Twenty-Four Hours (news magazine)
 0545 BBC: The World Today (news feature)
 0600 BBC: Newsdesk
 0630 BBC: Meridian (arts feature)
 0700 BBC: World News
 0709 BBC: Twenty-Four Hours (news magazine)
 0730 BBC: Write On... (letters)
 0745 BBC: Seven Seas
 0800 BBC: World News
 0800 RA: International Report
 0809 BBC: Reflections (religion)
 0825 RA: Stock Exchange Report
 0827 RA: Propagation Report
 0830 BBC: Music Now (modern classical music)
 0830 RA: Sports Results
 0845 RA: Music of RA
 0900 BBC: World News
 0900 RA: World and Australian News
 0909 BBC: British Press Review
 0913 RA: Music of RA
 0915 BBC: The World Today (news feature)
 0930 BBC: Financial News
 0930 RA: Smith's Weekly (news features and opinion)
 0940 BBC: Sports Roundup
 0945 RA: Music of RA
 1000 BBC: News Summary
 1000 RA: International Report
 1015 BBC: Seven Seas
 1025 RA: Stock Exchange Report
 1030 BBC: Five Faces of Jazz
 1030 RA: Just Out (new music releases)
 1100 BBC: World News
 1100 RA: World and Australian News
 1109 BBC: News About Britain
 1113 RA: Music of RA
 1115 BBC: Talking From... (Northern Ireland, Scotland, Wales)

Your Guide to Shortwave Listening in September

1130 BBC: Meridian (arts feature)
 1130 RA: International Top Hits
 1200 BBC: Radio Newsreel
 1200 RA: International Report
 1215 BBC: Europe's World
 1225 RA: Propagation Report
 1230 BBC: Business Matters
 1230 RA: Music Special
 1245 BBC: Sports Roundup
 1300 BBC: World News
 1300 RA: World and Australian News
 1309 BBC: Twenty-Four Hours (news magazine)
 1313 RA: Window on Australia
 1330 BBC: John Peel (progressive rock music)
 1330 RA: Sports Results
 1345 RA: Music of RA
 1400 BBC: World News
 1400 RA: International Report
 1405 BBC: Outlook
 1425 RA: Stock Exchange Report
 1430 RA: Music of RA
 1445 BBC: Nature Notebook
 1500 BBC: Radio Newsreel
 1600 BBC: World News
 1609 BBC: News About Britain
 1615 BBC: Science In Action
 1645 BBC: The World Today (news feature)
 1700 BBC: World News
 1709 BBC: Commentary
 1715 BBC: Music Now (modern classical music)
 1745 BBC: Sports Roundup
 1800 BBC: Newsdesk
 1830 BBC: Multitrack 3 - **** - Sarah Ward presents innovative rock music.
 1900 BBC: News Summary
 1901 BBC: Outlook
 1939 BBC: Stock Market Report
 1945 BBC: Personal View
 2000 BBC: World News
 2009 BBC: Twenty-Four Hours (news magazine)
 2030 BBC: Science In Action
 2100 BBC: News Summary
 2101 BBC: Network UK (feature)
 2115 BBC: Europe's World
 2130 BBC: Business Matters
 2130 RA: International Top Hits
 2145 BBC: Where Angels Fear to Tread (reading) [ex 23rd, 30th]
 2200 BBC: World News
 2209 BBC: The World Today (news feature)
 2230 BBC: Financial News
 2230 RA: At Your Request
 2240 BBC: Reflections (religion)
 2245 BBC: Sports Roundup
 2300 BBC: World News
 2300 RA: World and Australian News
 2309 BBC: Commentary
 2313 RA: Window on Australia
 2315 BBC: From The Weeklies (press review)

2330 BBC: Multitrack 3 - **** (see Fri 1830)
 2330 RA: Bicentennial Feature

Saturday

3rd, 10th, 17th, 24th

0000 BBC: World News
 0000 RA: International Report
 0009 BBC: News About Britain
 0015 BBC: Radio Newsreel
 0030 BBC: Personal View
 0030 RA: Just Out (new music releases)
 0045 BBC: Recording of the Week
 0100 BBC: News Summary
 0100 RA: World and Australian News
 0101 BBC: Outlook
 0113 RA: Book Readings
 0130 RA: Australian Country Style (local country music)
 0145 BBC: Nature Notebook
 0200 BBC: World News
 0200 RA: International Report
 0209 BBC: British Press Review
 0215 BBC: Network UK (feature)
 0230 BBC: Feature
 0230 RA: Bicentennial Feature
 0300 BBC: World News
 0300 RA: World and Australian News
 0309 BBC: News About Britain
 0313 RA: You Asked For It (listeners' questions)
 0315 BBC: The World Today (news feature)
 0330 BBC: Europe's World
 0330 RA: Music of RA
 0345 BBC: Business Matters
 0400 BBC: Newsdesk
 0430 BBC: Here's Humph!
 0445 BBC: Reflections (religion)
 0450 BBC: Financial News
 0500 BBC: World News
 0509 BBC: Twenty-Four Hours (news magazine)
 0530 BBC: Personal View
 0545 BBC: The World Today (news feature)
 0600 BBC: Newsdesk
 0630 BBC: Meridian (arts feature)
 0700 BBC: World News
 0709 BBC: Twenty-Four Hours (news magazine)
 0730 BBC: From The Weeklies (press review)
 0745 BBC: Network UK (feature)
 0800 BBC: World News
 0800 RA: International Report
 0809 BBC: Reflections (religion)
 0815 BBC: A Jolly Good Show (rock music)
 0827 RA: Propagation Report
 0830 RA: Sports Results
 0845 RA: Music of RA
 0900 BBC: World News
 0900 RA: World and Australian News
 0909 BBC: British Press Review
 0913 RA: Boomerang (letters)

0915 BBC: The World Today (news feature)
 0930 BBC: Financial News
 0930 RA: Bicentennial Feature
 0940 BBC: Sports Roundup
 0945 BBC: Personal View
 1000 BBC: News Summary
 1000 RA: International Report
 1001 BBC: Here's Humph!
 1015 BBC: Letter From America
 1030 BBC: Feature
 1030 RA: Interaction (exploring Australia)
 1100 BBC: World News
 1100 RA: World and Australian News
 1109 BBC: News About Britain
 1113 RA: Music of RA
 1130 BBC: Meridian (arts feature)
 1130 RA: Soundabout (contemporary music)
 1200 BBC: Radio Newsreel
 1200 RA: International Report
 1215 BBC: Multitrack 3 - **** (see Fri 1830)
 1225 RA: Propagation Report
 1230 RA: International Country Music
 1245 BBC: Sports Roundup
 1300 BBC: World News
 1300 RA: World and Australian News
 1309 BBC: Twenty-Four Hours (news magazine)
 1313 RA: You Asked For It (listeners' questions)
 1330 BBC: Network UK (feature)
 1330 RA: Sports Results
 1345 BBC: Sportsworld
 1345 RA: Book Readings
 1400 BBC: News Summary
 1400 RA: International Report
 1401 BBC: Sportsworld
 1430 RA: Boomerang (letters)
 1445 RA: Music of RA
 1500 BBC: Radio Newsreel
 1515 BBC: Sportsworld
 1600 BBC: World News
 1609 BBC: News About Britain
 1615 BBC: Sportsworld
 1700 BBC: World News
 1709 BBC: Words
 1715 BBC: The Ken Bruce Show (music mix with entertainment news)
 1745 BBC: Sports Roundup
 1800 BBC: Newsdesk
 1900 BBC: News Summary
 1930 BBC: Feature
 2000 BBC: World News
 2009 BBC: Twenty-Four Hours (news magazine)
 2030 BBC: Meridian (arts feature)
 2100 BBC: News Summary
 2101 BBC: Whither Wisdom?
 2130 RA: Soundabout (contemporary music)
 2200 BBC: World News
 2209 BBC: From Our Own Correspondent - **** (see Sun 0315)
 2225 BBC: Nature Notebook
 2230 RA: Music Special

frequency SECTION

MT Monitoring Team

EAST COAST:

Greg Jordan,
Frequency Manager

1855-I Franciscan Terrace
Winston-Salem, NC 27127

Joe Hanlon, PA

WEST COAST:

Bill Brinkley, CA

Dave Kammler, CA

0000 UTC [8:00 PM EDT/5:00 PM PDT]

0000-0015	Voice of Kampuchea, Phnom-Penh	9693	11938		
0000-0030	BBC, London, England	5975	6005	6175	7325
		9515	9580	9590	9915
		12095	11955		
0000-0030	Kol Israel, Jerusalem	9435	11605	12080	
0000-0030	Radio Berlin Int'l, East Germany	6080	9730		
0000-0030	Radio Korea, Seoul, South Korea	15575			
0000-0030 M	Radio Norway Int'l, Oslo	9620	11840		
0000-0030 S,M	WINB, Red Lion, Pennsylvania	15145			
0000-0050	Radio Pyongyang, North Korea	15115	15160		
0000-0055	Radio Beijing, PR China	9770	11715	15455	
0000-0100	(US) Armed Forces Radio and TV	6030	11790	15345	
0000-0100	All India Radio, New Delhi	6055	7215	9535	9910
		11715	11745	15110	
0000-0100	CBC Northern Quebec Service	6195	9625		
0000-0100	CBN, St. John's, Newfoundland	6160			
0000-0100	CBU, Vancouver, British Columbia	6160			
0000-0100	CFCF, Montreal, Quebec	6005			
0000-0100	CFCN, Calgary, Alberta	6030			
0000-0100	CHNS, Halifax, Nova Scotia	6130			
0000-0100	CKWX, Vancouver, British Columbia	6080			
0000-0100	CFRB, Toronto, Ontario	6070			
0000-0100	FEBC, Manila, Philippines	15445			
0000-0100	(US) Far East Network, Tokyo	3910			
0000-0100	KSDA, Guam	15125			
0000-0100 T-A	KVOH, Rancho Simi, California	17775			
0000-0100	KYOI, Saipan	15405			
0000-0100	Radio Australia, Melbourne	15140	15160	15240	15320
		15395	17750	17795	
0000-0100	Radio Baghdad, Iraq	11775	11810		
0000-0100 S,M	Radio Canada Int'l, Montreal	5960	9755		
0000-0100	Radio Havana Cuba	9655			
0000-0100	Radio Luxembourg	6090			
0000-0100	Radio Moscow, USSR	9530	9600	9610	9700
		9765	9865	11710	11750
		11780	12060	13605	15245

0000-0100	Radio Moscow World Service	15405	15425		
		17570	17635	17675	17685
		17740	17850	17860	
0000-0100	Radio New Zealand, Wellington	15150	17705		
0000-0100	Radio for Peace, Costa Rica	7375v			
0000-0100	Radio Thailand, Bangkok	9655	11905		
0000-0100	SBC Radio One, Singapore	5010	5052	11940	
0000-0100	Spanish Foreign Radio, Madrid	9630	11880		
0000-0100 T-S	Superpower KUSW, Utah	15580			
0000-0100	Voice of America, Washington	5995	6130	7170	7200
		7280	9455	9775	9815
		11580	11695	11740	15205
0000-0100 T-A	Voice of Nicaragua, Managua	6100			
0000-0100	WCSN, Boston, Massachusetts	9850			
0000-0100	WHRI, Noblesville, Indiana	7400	9495		
0000-0100	WRNO New Orleans, Louisiana	7355			
0000-0100	WYFR, Oakland, California	5950	6085	9680	
0000-0100 T-A	WYFR Satellite Net, California	9505			
0030-0045	BBC, London, England*	6195	7235	9570	11820
		15435			
0030-0100	BBC, London, England	5975	6005	6175	6195
		7135	7325	9515	9915
		9590	11955	12095	15435
0030-0100	HCJB, Quito, Ecuador	9720	11775	11910	15155
0030-0100	Radio Austria Int'l, Vienna	9875			
0030-0100	Radio Budapest, Hungary	6110	9520	9835	9883
		11910	15160		
0030-0100	SLBC, Colombo, Sri Lanka	6005	9720		
0030-0100	WINB, Red Lion, Pennsylvania	15145			
0035-0040	All India Radio, New Delhi	3925	4860		

LEGEND

- * The first four digits of an entry are the broadcast start time in UTC. The second four digits represent the end time.
- * In the space between the end time and the station name is the broadcast schedule.

S=Sunday M=Monday T=Tuesday W=Wednesday
H=Thursday F=Friday A=Saturday

If there is no entry, the broadcasts are heard daily. If, for example, there is an entry of "M," the broadcast would be heard only on Mondays. An entry of "M,W,F" would mean Mondays, Wednesdays and Fridays only. "M-F" would mean Mondays through Fridays. "TEN" indicates a tentative schedule and "TES" a test transmission.

- * [ML] after a frequency indicates a multi-lingual transmission containing English-language programs.
- * The last entry on a line is the frequency. Codes here include "SSB" which indicates a Single Sideband transmission, and "V" for a frequency that varies. [ML] after a frequency indicates a multi-lingual transmission containing English-language programs.
- * v after a frequency indicates that it varies
- * Notations of USB and LSB (upper and lower sideband transmissions) usually refer only to the individual frequency after which they appear.
- * Listings followed by an asterisk (*) are for English lessons and do not contain regularly scheduled programming.

We suggest that you begin with the lower frequencies that a station is broadcasting on and work your way up the dial. Remember that there is no guarantee that a station will be audible on any given day. Reception conditions can change rapidly, though, and if it is not audible one night, it may well be on another.

HOW TO USE THE PROPAGATION CHARTS

Propagation charts can be an invaluable aid to the DXer in determining which frequencies are likely to be open at a given time. To use the propagation charts, choose those for your location (the are divided into east coast, midwest and west coast of North America). Then look for the one most closely describing the geographic location of the station you want to hear.

Once you've located the correct charts, look along the horizontal axis of the graph for the time that you are listening. The top line of the graph shows the Maximum Useable Frequency [MUF] and the lower line the Lowest Useable Frequency [LUF] as indicated on the vertical axis of the graph.

While there are exceptions to every rule (especially those regarding shortwave listening), you should find the charts helpful in determining the best times to listen for particular regions of the world. Good luck!

frequency SECTION

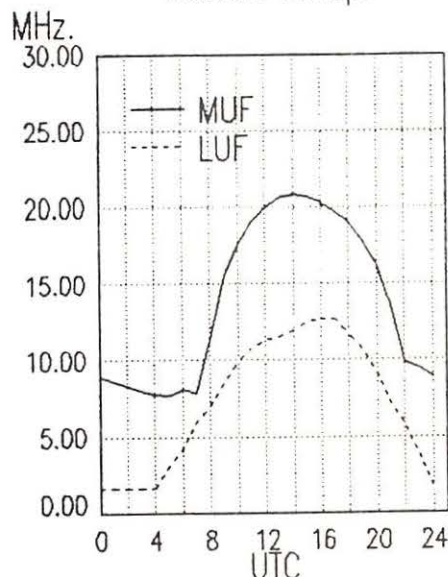
0045-0100 A Radio New Zealand, Wellington 15150 17705
0050-0100 Vatican Radio, Vatican City 6150 9605 11780

0100 UTC [9:00 PM EDT/6:00 PM PDT]

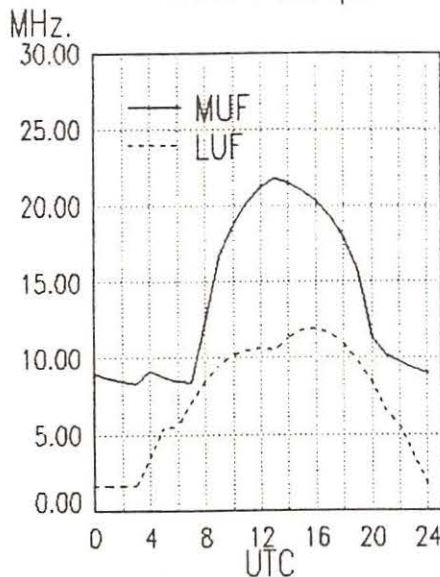
0100-0103 S Port Moresby, Papua New Guinea 3295 4890 5960 5985
6020 6040 6080 6140
9520
0100-0110 Vatican Radio, Vatican City 6150 9605 11780
0100-0115 All India Radio, New Delhi 6055 7215 9535 9910
11715 11745 15110
0100-0120 RAI, Rome, Italy 9575 11800
0100-0125 Kol Israel, Jerusalem 9435 11605 12080
0100-0130 W,A Radio Budapest, Hungary 6110 9520 9585 9835
9883 11910 15160
15280 17810 17835 17845
0100-0130 Radio Japan, Tokyo 7113v
0100-0130 Laotian National Radio 6080 9730
0100-0145 Radio Berlin Int'l, E. Germany 6040 6085 6145 9565
0100-0150 Deutsche Welle, West Germany 9735 11865
11775 11810
0100-0150 Radio Baghdad, Iraq 9875
0100-0155 Radio Austria Int'l, Vienna 6030 11790 15345
0100-0200 (US) Armed Forces Radio and TV 5975 6005 6175 7325
BBC, London, England 9515 9590 9915
9515 9625
0100-0200 CBC Northern Quebec Service 6160
0100-0200 CBN, St. John's, Newfoundland 6160
0100-0200 CBU, Vancouver, British Columbia 6005
0100-0200 CFCF, Montreal, Quebec 6030
0100-0200 CFCN, Calgary, Alberta 6130
0100-0200 CHNS, Halifax, Nova Scotia 6080
0100-0200 CKWX, Vancouver, British Columbia 6070
0100-0200 CFRB, Toronto, Ontario 3910
0100-0200 (US) Far East Network, Tokyo 15445
0100-0200 FEBC, Manila, Philippines 9720 11775 11910 15155
0100-0200 HCJB, Quito, Ecuador 17775
0100-0200 T-A KVOH, Rancho Simi, California 15405
KYOI, Salpan

0100-0200 Radio Australia, Melbourne 15160 15180 15240 15320
15395 17715 17795
17750
0100-0200 Radio Canada Int'l, Montreal 9535 9755 11845 11940
0100-0200 Radio Havana Cuba 9655
0100-0200 Radio Japan, Tokyo 5960 11815 17810
0100-0200 Radio Luxembourg 6090
0100-0200 Radio Moscow, USSR 9530 9600 9610 9700
9765 9865 11710 11750
12060 13605 15405 15245
15425 15455
0100-0200 Radio Moscow World Service 17570 17675 17685 17740
17850 17860 17880
12045 15150
0100-0200 Radio New Zealand, Wellington 7375v
0100-0200 Radio for Peace, Costa Rica 5930 6055 7345 9540
0100-0200 Radio Prague, Czechoslovakia 9630 9740 11990
9655 11905
0100-0200 Radio Thailand, Bangkok 5010 5052 11940
0100-0200 SBC Radio One, Singapore 6005 9720 15425
0100-0200 SLBC, Colombo, Sri Lanka 9630 11880
0100-0200 Spanish Foreign Radio, Madrid 11695
0100-0200 T-S Superpower KUSW, Utah 5995 6125 6130 7170
0100-0200 Voice of America, Washington 7200 7280 9455 9575
9775 9815 11580 11740
11900 15160 15205 17735
9680 11790
0100-0200 Voice of Indonesia, Jakarta 9850
0100-0200 WCSN, Boston, Massachusetts 15145
0100-0200 WINB, Red Lion, Pennsylvania 7400 9495
0100-0200 WHRI, Noblesville, Indiana 7355
0100-0200 WRNO, New Orleans, Louisiana 5950 9680 15170
0100-0200 WYFR, Oakland, California 9505
0100-0200 T-S WYFR Satellite Net, California 7430 9420 11645
0130-0140 T-S Voice of Greece, Athens 9520 9835 9883 11910
0130-0145 TWFS Radio Budapest, Hungary 15160
0130-0155 S Radio Austria Int'l, Vienna 9875
0130-0200 Radio Veritas Asia, Philippines 15330 15365
0145-0200 Radio Berlin Int'l, E. Germany 6080 9620 9730 11785
0145-0200 Radio Korea, Seoul, South Korea 7275 15375

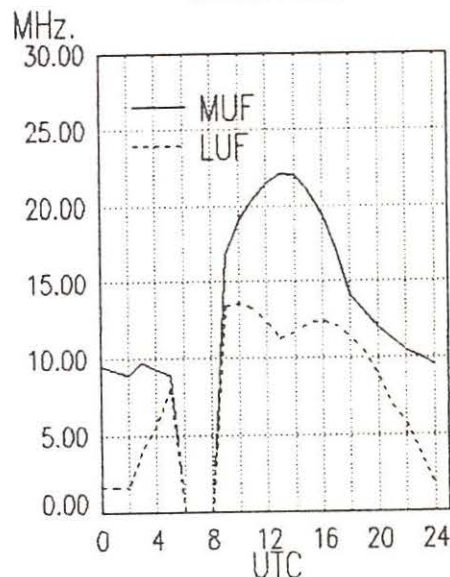
East Coast To
Western Europe



East Coast To
Eastern Europe



East Coast To
Middle East



frequency SECTION

0200 UTC [10:00 PM EDT/7:00 PM PDT]

0200-0215	Vatican Radio, Vatican City	7125	9650		
0200-0230	BBC, London, England	5975	6005	6175	7325
		9410	9515	9590	9915
0200-0230	Burma Bcsting Service, Rangoon	7185			
0200-0230	S Radio Austria Int'l, Vienna	9875			
0200-0230	Radio Berlin Int'l, E. Germany	6080	9620	9730	11785
0200-0230	Radio Kiev, Ukrainian SSR	9640	9800	11790	13645
		15180	15455		
0200-0230	Swiss Radio Int'l, Berne	6135	9725	9885	12035
		17730			
0200-0230	WINB, Red Lion, Pennsylvania	15145			
0200-0250	Deutsche Welle, West Germany	6035	7285	9690	11945
0200-0250	Radio Bras, Brasilia, Brazil	11745v			
0200-0255	Radio Bucharest, Romania	5990	6155	9510	9570
		11830	11940		
0200-0255	RAE, Buenos Aires, Argentina	9690	11710		
0200-0300	(US) Armed Forces Radio and TV	6030	11790	15345	
0200-0300	CBC Northern Quebec Service	6195	9625		
0200-0300	CBN, St. John's, Newfoundland	6160			
0200-0300	CBU, Vancouver, British Colombia	6160			
0200-0300	CFCF, Montreal, Quebec	6005			
0200-0300	CFCN, Calgary, Alberta	6030			
0200-0300	CFRB, Toronto, Ontario	6070			
0200-0300	CHNS, Halifax, Nova Scotia	6130			
0200-0300	CKWX, Vancouver, British Colombia	6080			
0200-0300	(US) Far East Network, Tokyo	3910			
0200-0300	HCJB, Quito, Ecuador	9720	11775	15155	
0200-0300	T-A KVOH, Rancho Simi, California	17775			
0200-0300	KSDA, Guam	17865			
0200-0300	Radio Australia, Melbourne	15180	15240	15320	17715
		17750	17795		
0200-0300	Radio Cairo, Egypt	9475	9675		
0200-0300	Radio Havana Cuba	6140	9655		
0200-0300	Radio Korea (South), Seoul	7275	15575		
0200-0300	Radio Luxembourg	6090			
0200-0300	Radio Moscow, USSR	9530	9600	9610	9765

COMPUTERS

RADIO =



ham
radio
Amateur Radio
State-of-the-Art



Try a subscription to Ham Radio Magazine for one year for just \$19.95. SAVE \$3 off the regular Ham Radio subscription rate of \$22.95 and \$10 off the newsstand price.

Ham Radio gives you more technical articles and the very best technical articles of the Amateur journals. Transmitters, receivers, antennas, as well as state-of-the-art design theory and practical articles. Ham Radio has got it all! In May there's our annual Antenna Issue — chock full of all kinds of antenna design ideas and projects. November brings the Receiver Issue — the very latest in receiver technology for the Radio Amateur. Many consider these two issues alone worth the price of a year's subscription.

And there's more! Monthly columns by: Joe Carr, K4IPV on the ins and outs of repairing and troubleshooting your radio; Bill Orr, W6SAI on antennas and antenna technology plus a lot more; noted HF/VHF operator and DX'er Joe Reisert, W1JR's world of VHF and UHF technology; and noted government propagation expert Garth Stonehocker, KØRYW on propagation.

There's even more — but you'll have to get a subscription to find out what it is.

Fill out the coupon today and send it in before you miss another issue! Remember — you not only get Amateur Radio's finest magazine, you also SAVE \$3.00 off the regular rate.

Special Trial Subscription
Save \$3.00 off the regular
rate of \$22.95/year

JUST \$19.95

Prices US Subscriptions only

Sure I'll give Ham Radio a try. Sign me up for a one year subscription. Just \$19.95 for 12 issues. That's a \$3 savings off the regular rate of \$22.95.

Start my New Subscription

☐ Payment Enclosed ☐ Charge to MC ☐ VISA

Card Number _____ Expires _____

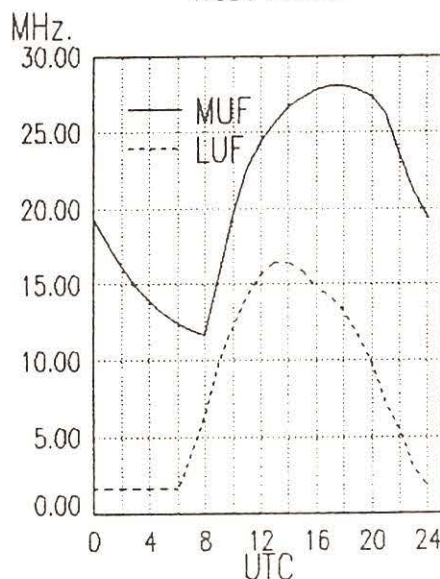
Name _____

Address _____

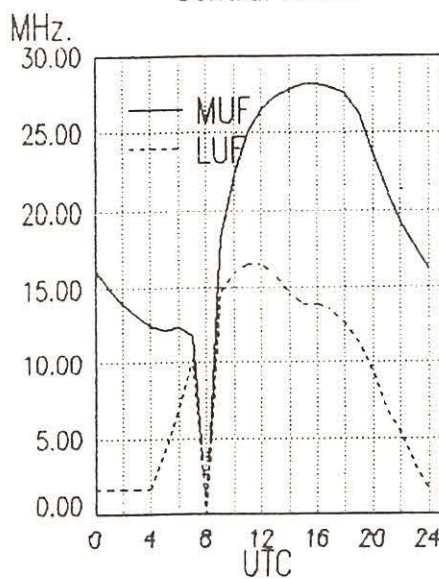
City _____ State _____ Zip _____

ham radio magazine, Dept. MT, Greenville, NH 03048

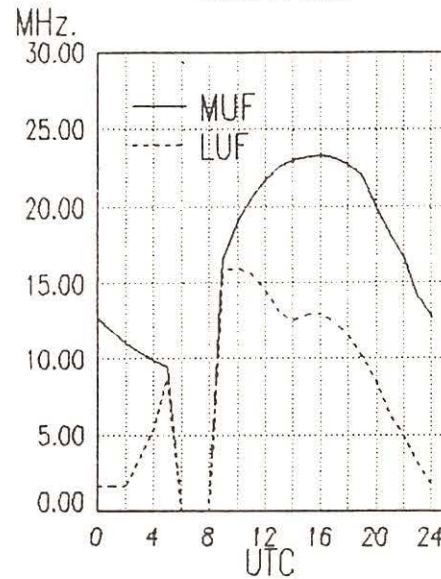
East Coast To
West Africa



East Coast To
Central Africa



East Coast To
East Africa



frequency SECTION

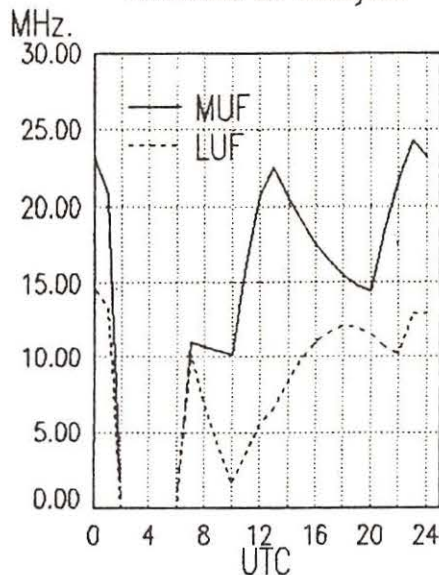
0400-0430	Trans World Radio, Bonaire	9535		
0400-0450	Radio Pyongyang, North Korea	15160	15180	
0400-0455	Radio Beijing, PR China	9645	11980	
0400-0455	RAE, Buenos Aires, Argentina	9690	11710	
0400-0500	(US) Armed Forces Radio and TV	6030	11730 11790	
0400-0500	CBC Northern Quebec Service	6195	9625	
0400-0500	CBN, St. John's, Newfoundland	6160		
0400-0500	CBU, Vancouver, British Columbia	6160		
0400-0500	CFCF, Montreal, Quebec	6005		
0400-0500	CFCN, Calgary, Alberta	6030		
0400-0500	CHNS, Halifax, Nova Scotia	6130		
0400-0500	CKWX, Vancouver, British Columbia	6080		
0400-0500	CFRB, Toronto, Ontario	6070		
0400-0500	(US) Far East Network, Tokyo	3910		
0400-0500	FEBC, Manila, Philippines	11850		
0400-0500	HCJB, Quito, Ecuador	9720	11775 15155	
0400-0500	KYOI, Salpan	17780		
0400-0500	Radio Australia, Melbourne	11910	11945 15160 15240	
		15320	17795	
0400-0500	Radio for Peace, Costa Rica	13660		
0400-0500	Radio Havana Cuba	5965	6035 6140 9655	
		9770		
0400-0500	Radio Moscow, USSR	9530	9600 9610 9635	
		9640	9765 12050 13605	
		13645	13665 15180 15320	
		15405	15425 15445 15585	
		17570	17600 17685 17735	
		17850	17860 17880	
0400-0500	Radio New Zealand, Wellington	12045	15150	
0400-0500	SBC Radio One, Singapore	5010	5052 11940	
0400-0500 S	Superpower KUSW, Utah	9815		
0400-0500	Voice of America, Washington	5995	6035 7170 7200	
		7280	9525 9575 11835	
		11925	15205	
0400-0500	Voice of Kenya, Nairobi	6045		
0400-0500	WCSN, Boston, Massachusetts	9870		
0400-0500	WINB, Red Lion, Pennsylvania	15145		
0400-0500	WHRI, Noblesville, Indiana	7365	7400	
0400-0500 M-A	WMLK, Bethel, Pennsylvania	9455		
0400-0500	WRNO, New Orleans, Louisiana	6185		

0400-0500	WYFR, Okeechobee, Florida	5950	9520	
0425-0440	RAI, Rome, Italy	5980	7275	
0430-0455	Radio Austria Int'l, Vienna	6155	9875 15410	
0430-0500	BBC, London, England	3955	5975 5898 6005	
		6195	7120 7185 7210	
		9410	9510 9580 9750	
		11945	12095 15070	
0430-0500	Deutsche Welle, West Germany	7150	7225 9565 9765	
		11765		
0430-0500	Radio Finland, Helsinki	6120	9670 11715 15185	
0430-0500	Radio Tirana, Albania	9480	11835	
0430-0500 S,M	Trans World Radio, Bonaire	9535		
0430-0500	Trans World Radio, Swaziland	3205	7205	
0430-0500	Voice of Nigeria, Lagos	7255		

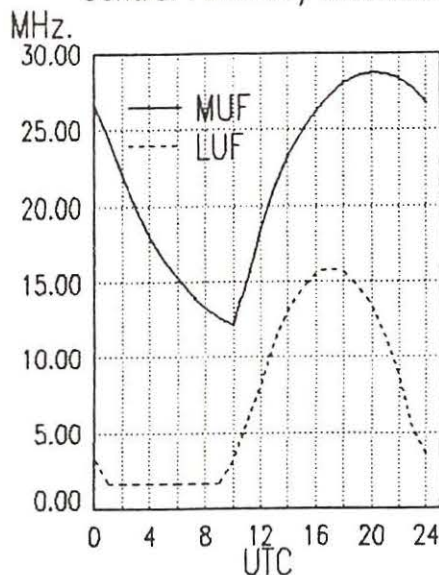
0500 UTC [1:00 AM EDT/10:00 PM PDT]

0500-0510	CBC Northern Quebec Service	6195	9625	
0500-0510	Radio Lesotho, Maseru	4800		
0500-0510 M-A	Radio Zambia, Lusaka	3345	6165	
0500-0515	Deutsche Welle, West Germany	7150	7225 9565 9765	
		11765		
0500-0515	GBC, Accra, Ghana	4915		
0500-0515	Vatican Radio, Vatican City	9645	11725 15190	
0500-0530 M	Radio Norway Int'l, Oslo	11735	15310	
0500-0530 S,M	Trans World Radio, Bonaire	9535		
0500-0530	Trans World Radio, Swaziland	3205	5055 7210	
0500-0550	Deutsche Welle, West Germany	6045	6120 9635 9700	
0500-0555	Radio Beijing, China	9690		
0500-0600	(US) Armed Forces Radio and TV	6030	11730 11790	
0500-0600	BBC, London, England	5898	7105 7160 7185	
		9410	9510 9580 12095	
0500-0600	CBC Northern Quebec Service	6195	9625	
0500-0600	CBU, Vancouver, British Columbia	6160		
0500-0600	CFCF, Montreal, Quebec	6005		
0500-0600	CFCN, Calgary, Alberta	6030		
0500-0600	CHNS, Halifax, Nova Scotia	6130		
0500-0600	CKWX, Vancouver, British Columbia	6080		

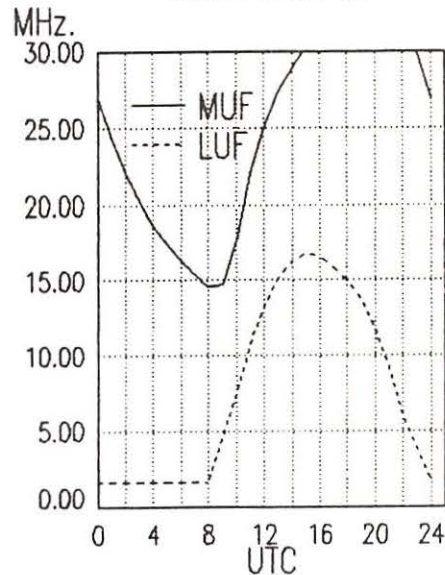
East Coast To
Australia & Malaysia



East Coast To
Central America/Caribbean



East Coast To
South America



frequency SECTION

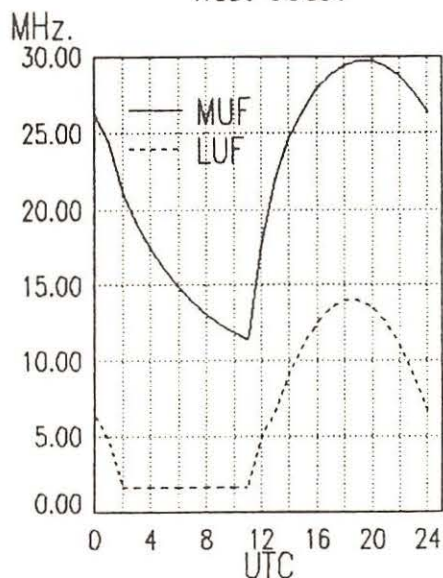
0500-0600	CFRB, Toronto, Ontario	6070			
0500-0600	(US) Far East Network, Tokyo	3910			
0500-0600	FEBC, Manila, Philippines	11850			
0500-0600	HCJB, Quito, Ecuador	6230	9720	11775	
0500-0600	Radio Australia, Melbourne	11910	15160	15240	15395
		17715	17750	17795	
		13660			
0500-0600	Radio for Peace, Cost Rica	5965	6035	9655	9770
0500-0600	Radio Havana Cuba	11870	17810		
0500-0600	Radio Japan, Tokyo	15345			
0500-0600	Radio Kuwait	9765	9865		
0500-0600	Radio Moscow, USSR	12045	15150		
0500-0600	Radio New Zealand, Wellington	9655	11905		
0500-0600	Radio Thailand, Bangkok	11880			
0500-0600 S	Radio Zambia, Lusaka	5010	5052	11940	
0500-0600	SBC Radio One, Singapore	9630			
0500-0600	Spanish Foreign Radio, Madrid	6155			
0500-0600 S	Superpower KUSW, Utah	6155	9705		
0500-0600	Swaziland Commercial Radio	5995	7170	7280	9575
0500-0600	Voice of America, Washington	6045			
0500-0600	Voice of Kenya, Nairobi	6100			
0500-0600	Voice of Nicaragua, Managua	7255	15120	15185	
0500-0600	Voice of Nigeria, Lagos	9870			
0500-0600	WCSN, Boston, Massachusetts	7365	7400		
0500-0600	WHRI, Noblesville, Indiana	9455			
0500-0600 M-A	WMLK, Bethel, Pennsylvania	6185			
0500-0600	WRNO, New Orleans, Louisiana	9705	11580		
0500-0600	WYFR, Oakland, California	9520			
0500-0600 T-S	WYFR Satellite Net, California	3356	4820	7255	
0510-0520	Radio Botswana, Gaborone	15245			
0515-0530 M-F	Radio Canada Int'l, Montreal	3990	6050	6140	7210
0530-0545	BBC, London, England*	9750			
		9640	11840	11940	15340
0530-0555	Radio Bucharest, Romania	15380	17720		
		6165	9715		
0530-0600	Radio Netherland, Hilversum	7300			
0530-0600	Radio Tirana, Albania	5055	7210		
0530-0600	Trans World Radio, Swaziland	15435	17775	21700	
0530-0600	UAE Radio, United Arab Emirates	15240	17880	21540	21645
0545-0600	Radio Berlin Int'l, East Germany	15245			
0545-0600 M-F	Radio Canada Intl, Montreal				

0555-0600	Ghana Broadcasting Corp., Accra	4915			
0555-0600	Voice of Malaysia, Kuala Lumpur	6175	9750	15295	

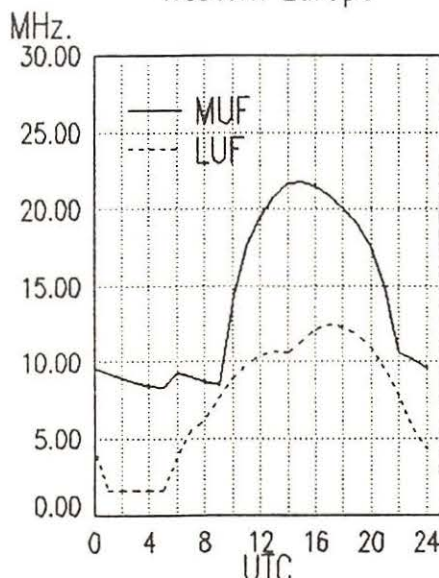
0600 UTC [2:00 AM EDT/11:00 PM PDT]

0600-0615	Radio Ghana, Accra	3366	4915		
0600-0615 M-A	Radio Zambia, Lusaka	6165	7235		
0600-0620	Vatican Radio, Vatican City	6185	9645		
0600-0625	Radio Netherlands, Hilversum	6165	9715		
0600-0630	Laotian National Radio	7113			
0600-0630	Radio Australia, Melbourne	11910	11945	15160	15240
		15315	15395	15425	17715
		17750			
		17795			
0600-0630	Radio Berlin Int'l, East Germany	17880			
0600-0630	Trans World Radio, Swaziland	6070			
0600-0630	Voice of Kenya, Nairobi	6045			
0600-0645	HCJB, Quito, Ecuador	6230	9720	11775	
0600-0645	Radio Berlin Int'l, East Germany	5965	11810		
0600-0645 S	Radio Cameroon, Yaounde	4850			
0600-0650	Radio Pyongyang, North Korea	9530	15160	15180	
0600-0700	(US) Armed Forces Radio and TV	6030	11730	11790	
0600-0700	BBC, London, England	5975	9600	9640	12095
		15280			
0600-0700	CBC Northern Quebec Service	6195			
0600-0700	CBU, Vancouver, British Columbia	6160			
0600-0700	CFCF, Montreal, Quebec	6005			
0600-0700	CFCN, Calgary, Alberta	6030			
0600-0700	CHNS, Halifax, Nova Scotia	6130			
0600-0700	CKWX, Vancouver, British Columbia	6080			
0600-0700	CFRB, Toronto, Ontario	6070			
0600-0700	(US) Far East Network, Tokyo	3910			
0600-0700 F	FEBA, Mahe, Seychelles	17855			
0600-0700	King of Hope, South Lebanon	6215			
0600-0700	KYOI, Salpan	17780			
0600-0700	Radio Havana Cuba	9525			
0600-0700	Radio Korea, Seoul, South Korea	6060	7275	9570	
0600-0700	Radio Kuwait	15345			

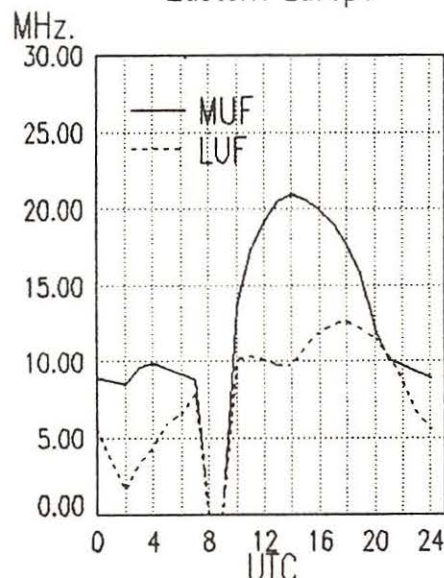
East Coast To
West Coast



Midwest To
Western Europe



Midwest To
Eastern Europe



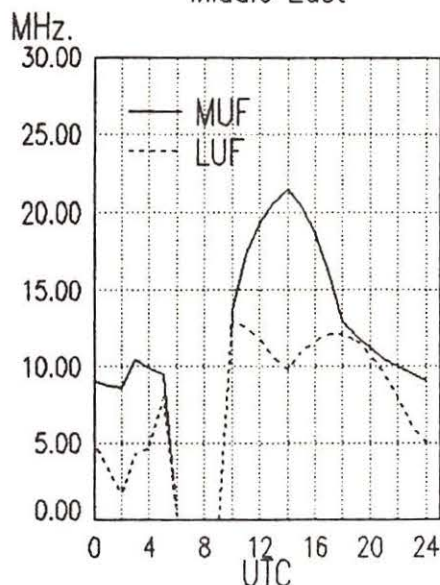
frequency SECTION

0600-0700	Radio Moscow, USSR	9580 9635 11775 12030	0645-0700	Radio Bucharest, Romania	11940 15250 15335 17790
		12050 13605 13645 15180			17805 21665
		17570 17675 17685 17850	0645-0700 M-F	Radio Canada Int'l, Montreal	6050 6140 7155 9740
		17860 17880			9760 11840 15235
0600-0700	Radio New Zealand, Wellington	11780 15150	0645-0700	Radio Ghana, Accra	6130
0600-0700 A,S	Radio Thailand, Bangkok	9655 11905			11705 11800
0600-0700 S	Radio Zambia, Lusaka	11880	0645-0700	HCJB, Quito, Ecuador	6130 6230 9720 11775
0600-0700	SBC Radio One, Singapore	5010 5052 11940	0645-0700	Radio Bucharest, Romania	11940 15250 15335 17790
0600-0700 S	Superpower KUSW, Utah	6155			17805 21665
0600-0700	Trans World Radio Monte Carlo	7105	0645-0700 M-F	Radio Canada Int'l, Montreal	6050 6140 7155 9740
0600-0700	Voice of America, Washington	5995 6035 6080 6125			9760 11840 15235
		7280 9530 9540 9550	0645-0700	Radio Ghana, Accra	6130
		11915			11705 11800
0600-0700	Voice of Asia, Taiwan	7285			
0600-0700	Voice of Malaysia, Kuala Lumpur	6175 9750 15295			
0600-0700	Voice of Nigeria, Lagos	15185			
0600-0700	WCSN, Boston, Massachusetts	9495			
0600-0700	WHRI, Noblesville, Indiana	7365 7400			
0600-0700 M-A	WMLK, Bethel, Pennsylvania	9455			
0600-0700	WYFR, Oakland, California	5985 6065 7355 9520			
		9852.5			
0615-0630	Radio Korea, Seoul, South Korea	13670 15575			
0615-0630 M-A	Vatican Radio, Vatican City	15190 17730			
0615-0700	Deutsche Welle, West Germany	9610 9700 11765 15185			
0630-0700 A	CPBS-1, China*	11330 15550 15590 17605			
0630-0655	Radio Austria Int'l, Vienna	6000 6155 15410			
0630-0655	Radio Nederland, Hilversum	9895 11930			
0630-0700	Radio Australia, Melbourne	11945 15160 15240 15315			
		15395 15425 17715 17750			
		17795			
0630-0700	Radio Bucharest, Romania	21600			
0630-0700	Radio Finland, Helsinki	6120 9560 11755 15270			
0630-0700	Radio Polonia, Warsaw, Poland	6135 7270 15120			
0630-0700	Radio Tirana, Albania	7205 9500			
0630-0700	Swiss Radio Int'l, Berne	3985 6165 9535 12030			
		15430 17570			
0630-0700	Trans World Radio, Swaziland	5055 6070 7210 9725			
0630-0700 A,S	Voice of Kenya, Nairobi	7270			
0645-0700	BBC, London, England*	6150 7260 11945			
0645-0700	HCJB, Quito, Ecuador	6130 6230 9720 11775			

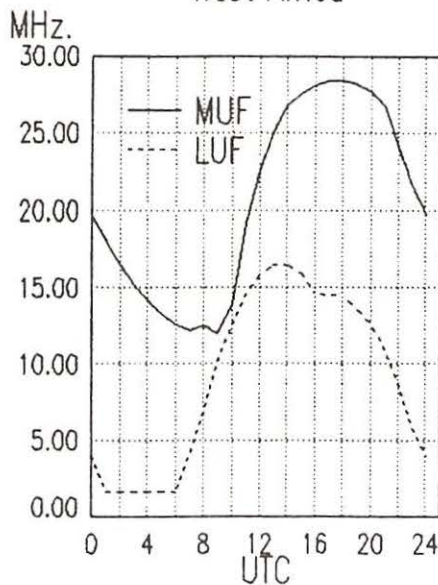
0700 UTC [3:00 AM EDT/12:00 AM PDT]

0700-0703	Port Moresby, Papua New Guinea	3925 4890 5960 5985
		6020 6040 6080 6140
		9520
0700-0710	Radio Bucharest, Romania	11940 15250 15335 17790
		17805 21665
0700-0710	Radio Sierra Leone, Freetown	5980
0700-0715	Radio Ghana (HS), Accra	3366 4915
0700-0730	BBC, London, England	5975 9600 9640 12095
		15280
0700-0730	Burma Broadcasting Service, Rangoon	9730
0700-0730	Radio Australia, Melbourne	9655 15160 15240 15395
		17715 17750
0700-0730	Radio Bucharest, Romania	21600
0700-0730	Radio New Zealand, Wellington	12045 15150
0700-0730 S	Radio Zambia, Lusaka	11880
0700-0745	WYFR, Oakland, California	6065 7355 9852.5
0700-0750	Radio Pyongyang, North Korea	15340 17795
0700-0800	AWR, Forli, Italy	7257
0700-0800	CBU, Vancouver, British Columbia	6130
0700-0800	CFCF, Montreal, Quebec	6005
0700-0800	CFCN, Calgary, Alberta	6030
0700-0800	CHNS, Halifax, Nova Scotia	6130

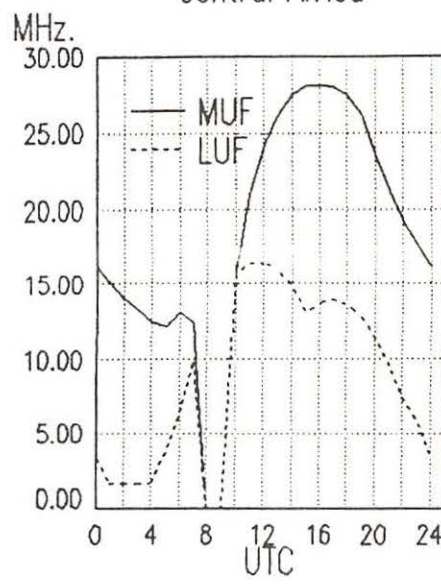
Midwest To
Middle East



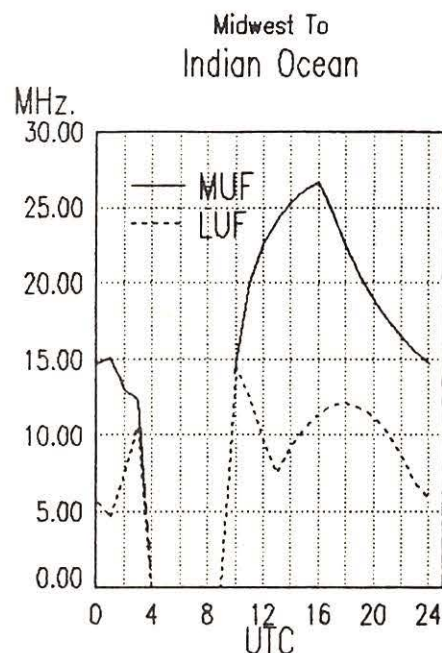
Midwest To
West Africa



Midwest To
Central Africa



0800 UTC		[4:00 AM EDT/1:00 AM PDT]				
0800-0805	M-F	Port Moresby, Papua New Guinea	3925	4890	5960	5985
			6020	6040	6080	6140
			9520			
0800-0805		Soloman Islands Broadcasting Corp	9545			
0800-0815	M-A	Radio Zambia, Lusaka	6165	7235		
0800-0825	M-F	BRT, Brussels, Belgium	11695	15510		
0800-0825		Radio Netherland, Hilversum	9630	9715		
0800-0825		Voice of Malaysia, Kuala Lumpur	6175	9750	15295	
0800-0830		HCJB, Quito, Ecuador	6130	9610	9745	11835
			11925			
0800-0830		Radio Bangladesh, Dhaka	12030	15525		
0800-0830		Radio Tirana, Albania	9500	11835		
0800-0830		Voice of Islam, Pakistan	15525	17870		
0800-0835	S	FEBA, Mahe, Seychelles	15325	17785		
0800-0835		Trans World Radio, Swaziland	6070	9725		
0800-0850		Radio Pyongyang, North Korea	9530	11830	15160	15180
0800-0900		ABC, Alice Springs, Australia	2310	[ML]		
0800-0900		ABC, Katherine, Australia	2485			
0800-0900		ABC, Tennant Creek, Australia	2325	[ML]		
0800-0900		BBC, London, England	9410	9640	11860	12095
			15070	15360	15400	
0800-0900		CBN, St. John's, Newfoundland	6160			
0800-0900		CBU, Vancouver, British Colombia	6160			
0800-0900		CFCF, Montreal, Quebec	6005			
0800-0900		CFCN, Calgary, Alberta	6030			
0800-0900		CHNS, Halifax, Nova Scotia	6130			



frequency SECTION

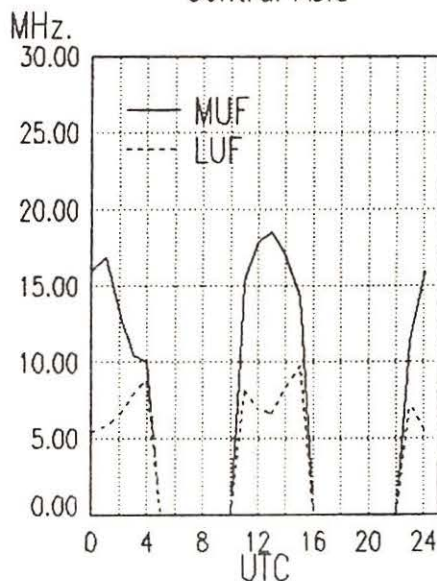
0800-0900	CKWX, Vancouver, British Columbia	6080			
0800-0900	CFRB, Toronto, Ontario	6070			
0800-0900	(US) Far East Network, Tokyo	3910			
0800-0900	King of Hope, South Lebanon	6215			
0800-0900	KNLS, Anchor Point, Alaska	6150			
0800-0900	KTWR, Guam	11805			
0800-0900	KYOI, Saipan	11900			
0800-0900	Radio Australia, Melbourne	5995	6080	9580	9655
		9710	11720		
0800-0900	Radio Korea, Seoul, South Korea	7550			
0800-0900	Radio Moscow, USSR	12055	15295		
0800-0900	SBC Radio One, Singapore	5010	5052	11940	
0800-0900	S Superpower KUSW, Utah	6135			
0800-0900	Trans World Radio, Monte Carlo	7105			
0800-0900	Voice of Indonesia, Jakarta	11790	15105		
0800-0900	A,S Voice of Kenya, Nairobi	7270			
0800-0900	Voice of Nigeria, Lagos	7255	15185		
0800-0900	WHRI, Noblesville, Indiana	7355	9510		
0800-0900	WYFR, Oakland, California	11580	15495		
0815-0830	S Radio Austria Int'l, Vienna	6155	11915	15410	15415
		17870			
0815-0830	Radio Korea, Seoul, South Korea	9570			
0815-0845	M-F Voice of America, Washington DC	7175	9575	9750	11710
		11915	15600	17715	21500
		[ML]			
0830-0840	All India Radio, New Delhi	5960	5990	6010	6020
		6050	6065	6100	6140
		7110	7140	7160	7250
		7280	7295	9610	11850
		15235	15250	17705	
0830-0855	Radio Austria Int'l, Vienna	6155	11915	15410	15415
0830-0855	M-A Radio Netherland, Hilversum	9630			
0830-0900	S Bhutan Bcating Service, Thimpu	6035			
0830-0900	FEBC, Manila, Philippines	11850	15350		
0830-0900	HCJB, Quito, Ecuador	6130	9745	11925	
0830-0900	Radio Beijing, China	9700	11755	15440	
0830-0900	Radio Finland, Helsinki	15245	17795		
0830-0900	Radio Netherland, Hilversum	9630	21486		
0830-0900	Radio Prague, Czechoslovakia	11685	17840	21705	

0830-0900	Swiss Radio Int'l, Berne	9560	9885	13685	17830
		21695			
0830-0900	Voice of Nigeria, Lagos	15120			
0840-0850	M-A Voice of Greece, Athens	9855	15630		
0845-0900	Radio Berlin Int'l, East Germany	21540			
0845-0900	Radio Prague, Czechoslovakia	6055	7345	9505	
0850-0900	All India Radio, New Delhi	5960	5990	6010	6020
		6050	6065	6100	6140
		7110	7140	7150	7160
		7250	7280	7295	9610
		11850	15235	15250	17705

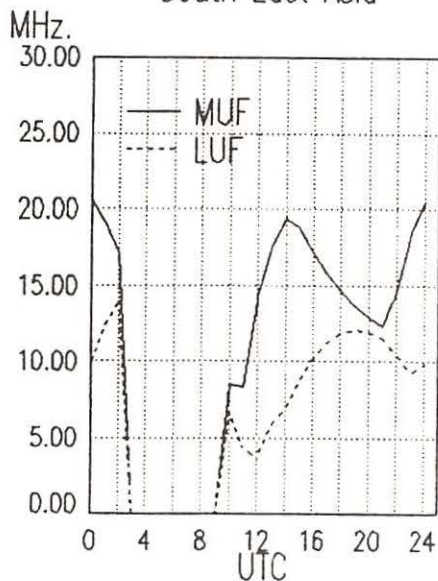
0900 UTC [5:00 AM EDT/2:00 AM PDT]

0900-0905	Africa No. 1, Gabon	7200	15200		
0900-0910	All India Radio, New Delhi	5960	5990	6010	6020
		6050	6065	6100	6140
		7110	7140	7150	7160
		7250	7280	7295	9610
		11850	15235	15250	17705
0900-0910	Port Moresby, Papua New Guinea	3295	4890	5960	5985
		6020	6040	6080	6140
		9520			
0900-0910	Voice of Lebanon, Beirut	6548			
0900-0930	FEBC, Manila, Philippines	11850	15350		
0900-0930	KTWR, Agana, Guam	11805			
0900-0930	Nippon Broadcasting Corp.	3925			
0900-0930	Radio Beijing, China	9700	11755	15440	
0900-0930	Radio Netherland, Hilversum	21485			
0900-0930	A,S Radio Prague, Czechoslovakia	11685	17840	21705	
0900-0945	Radio Berlin Int'l, East Germany	9665	21465	21540	
0900-0950	Deutsche Welle, West Germany	9720	15510	17780	21650
		21680			
0900-1000	ABC, Alice Springs, Australia	2310	[ML]		
0900-1000	ABC, Katherine, Australia	2485			
0900-1000	ABC, Tennant Creek, Australia	2325	[ML]		
0900-1000	S Adventist World Radio, Portugal	9670			
0900-1000	(US) Armed Forces Radio and TV	6030	9530	9565	

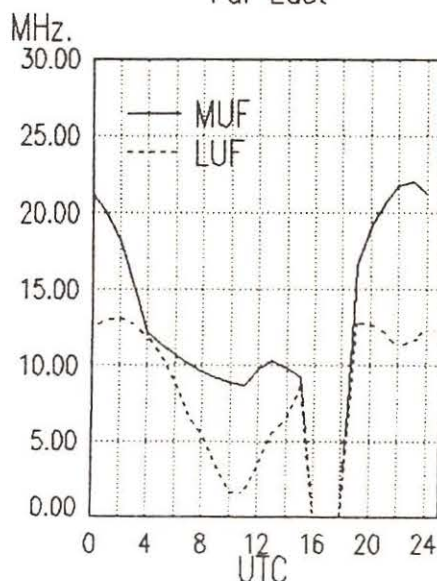
Midwest To
Central Asia



Midwest To
South East Asia



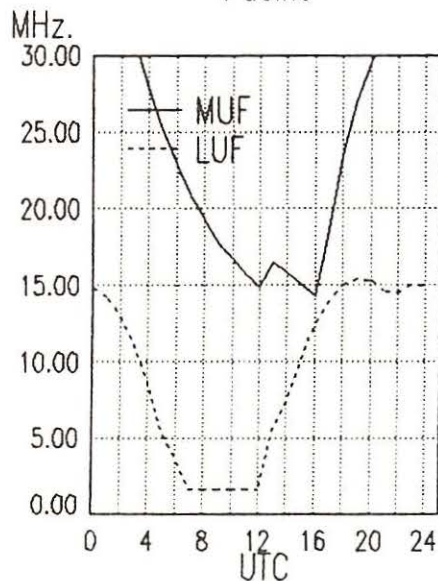
Midwest To
Far East



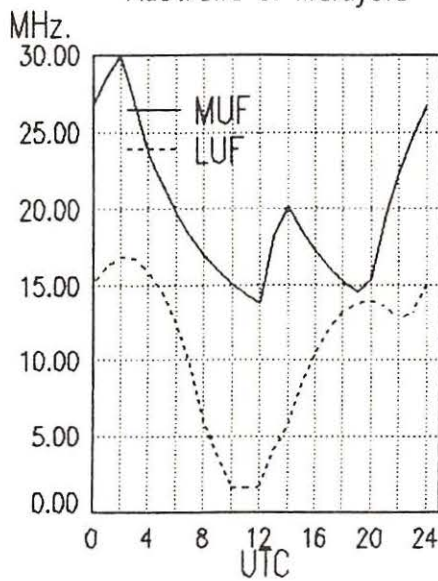
frequency SECTION

0900-1000	BBC, London, England	9740 11750 11860 11955	0945-1000 M-A	Radio Prague, Czechoslovakia	6055 7345 9505
		12095 15070 15400 15360			
		17790 18080			
0900-1000	CFCF, Montreal, Quebec	6005	1000 UTC [6:00 AM EDT/3:00 AM PDT]		
0900-1000	CFCN, Calgary, Alberta	6030	1000-1030	Deutsche Welle, West Germany	9735 11785 17765 21600
0900-1000	CHNS, Halifax, Nova Scotia	6130	1000-1030	HCJB, Quito, Ecuador	6130 9745 11925
0900-1000	CKWX, Vancouver, British Columbia	6080	1000-1030	Kol Israel, Jerusalem	9385 11700 15485 15640
0900-1000	CFRB, Toronto, Ontario	6070			15650 17635 17685 21625
0900-1000	(US) Far East Network, Tokyo	3910	1000-1030	Radio Afghanistan, Kabul	4450 6085 15435 17720
0900-1000	HCJB, Quito, Ecuador	6130 9745 11925	1000-1030	Radio Beijing, China	9700 11755 15440
0900-1000	King of Hope, South Lebanon	6215	1000-1030 S	Radio Norway Int'l, Oslo	21705
0900-1000	KNLS, Anchorage, Alaska	6150	1000-1030	Radio Tanzania, Dar es Salaam	7165
0900-1000	KYOI, Saipan	11900	1000-1030	Swiss Radio Int'l, Berne	9560 9885 13685 17830
0900-1000 S	Superpower KUSW, Utah	6135			21695
0900-1000	Radio Afghanistan, Kabul	4450 6085 15435 17720	1000-1030	Voice of Ethiopia, Addis Ababa	9560
0900-1000	Radio Australia, Melbourne	5995 6080 9580 9655	1000-1030	Voice of Vietnam, Hanoi	12020 15010
		9710 9760 11720 15415	1000-1055 A	Trans World Radio, Monte Carlo	7105
0900-1000	Radio Japan, Tokyo	11885	1000-1100	ABC, Alice Springs, Australia	2310 [ML]
0900-1000	Radio Moscow, USSR	12010 12055 15135	1000-1100	ABC, Katherine, Australia	2485
0900-1000 S	Radio Prague, Czechoslovakia	6055 7345 9505 [ML]	1000-1100	ABC, Tennant Creek, Australia	2325 [ML]
0900-1000	Radio Tanzania, Dar es Salaam	7165	1000-1100	(US) Armed Forces Radio and TV	6030 9530 9700
0900-1000	SBC Radio One, Singapore	5010 5052 11940	1000-1100	All India Radio, New Delhi	11860 11915 15130 15335
0900-1000	Trans World Radio, Monte Carlo	7105			17387 11785
0900-1000	Voice of Kenya, Nairobi	7270	1000-1100	BBC, London, England	9740 9750 11750 17790
0900-1000	Voice of Nigeria, Lagos	7255 15120 15185			12095 15070 15400 18080
0900-1000	WHRI, Noblesville, Indiana	7355 9510	1000-1100	CBN, St. John's, Newfoundland	6160
0915-0950 M-A	Radio Ulan Bator, Mongolia	9615 12015	1000-1100	CFCF, Montreal, Quebec	6005
0930-0935	All India Radio, New Delhi	5960 5990 6010 6020	1000-1100	CFCN, Calgary, Alberta	6030
		6050 6065 6100 6140	1000-1100	CHNS, Halifax, Nova Scotia	6130
		7110 7140 7160 7250	1000-1100	CKWX, Vancouver, British Columbia	6080
		7280 7295 9610 11850	1000-1100	CFRB, Toronto, Ontario	6070
		15235 15250 17705	1000-1100	(US) Far East Network, Tokyo	3910
0930-0940 M-F	Radio Canada Int'l, Montreal	5960 9755	1000-1100	KTWR, Agana, Guam	11805
0930-0945	BBC, London, England*	9725 11955	1000-1100	KYOI, Saipan	11900
0930-1000	CBN, St. John's, Newfoundland	6160	1000-1100	Radio Afghanistan, Kabul	15435 17720
0930-1000	KTWR, Guam	11805	1000-1100	Radio Australia, Melbourne	9580 9655 9770 15415
0930-1000	Radio Beijing, China	9700 11755 15440	1000-1100	Radio Moscow, USSR	9600 12055 13680 15135
0930-1000	Radio Sweden Int'l, Stockholm	15390			15150 15225
0945-1000	BBC, London, England*	5995 7180 9725 11955			
0945-1000 S	Radio Budapest, Hungary	9585 9835 11910 15160			

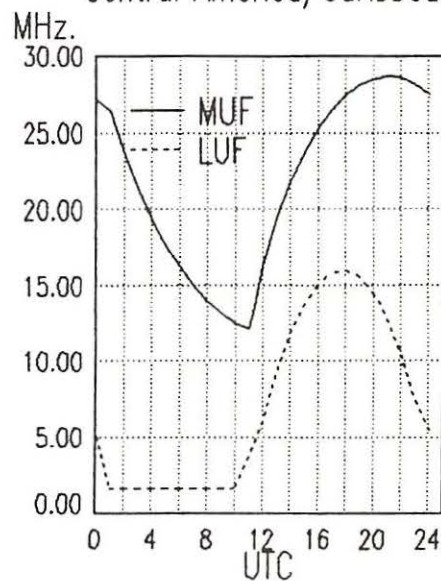
Midwest To
Pacific



Midwest To
Australia & Malaysia



Midwest To
Central America/Caribbean



frequency SECTION

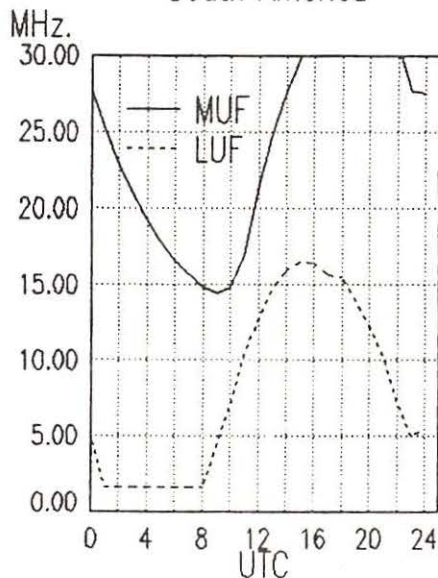
1000-1100	Radio New Zealand, Wellington	6100	9540
1000-1100 S	Radio Prague, Czechoslovakia	6055	7345 9505 [ML]
1000-1100	SBC Radio One, Singapore	5010	5052 11940
1000-1100	Superpower KUSW, Utah	6135	
1000-1100	Voice of America, Washington	5975	5985 9590
1000-1100	Voice of Kenya, Nairobi	7270	
1000-1100	Voice of Nigeria, Lagos	7255	15120
1000-1100	WHRI, Noblesville, Indiana	7355	9510
1000-1100	WYFR, Oakland, California	5950	
1005-1010	Radio Pakistan, Islamabad	15606	17660
1015-1030	Radio Korea, Seoul, South Korea	11740	
1030-1040	Voice of Asia, Taiwan	5980	
1030-1100	HCJB, Quito, Ecuador	6130	11925
1030-1045 A	Radio Budapest, Hungary	7220	9835 11910 15220
1030-1100	Radio Netherlands, Hilversum	6020	9675
1030-1100 A,S	Radio Tanzania, Dar es Salaam	7165	
1030-1100	SLBC, Colombo, Sri Lanka	11835	15120 17850 [ML]
1030-1100	UAE Radio, United Arab Emirates	15435	17865 21605
1040-1050 H	Radio Free Europe, Munich*	5985	7115 9695 9725
		11895	15355
1040-1050 M-A	Voice of Greece, Athens	11645	15630
1045-1100 M-A	Radio Prague, Czechoslovakia	6055	7345 9505
1055-1100 S	Trans World Radio, Monte Carlo	7105	

1100 UTC [7:00 AM EDT/4:00 AM PDT]

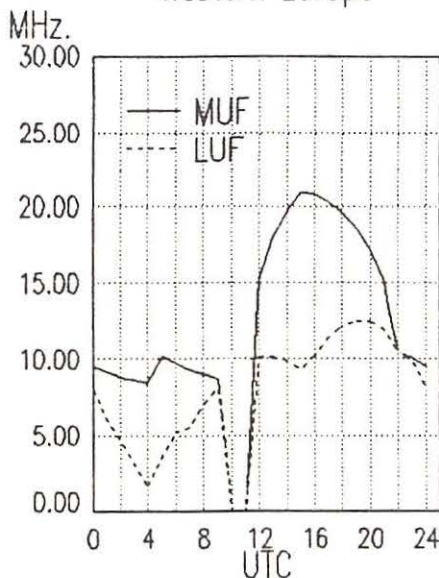
1100-1105	Radio Pakistan, Islamabad	6090	7290
1100-1105 A	Port Moresby, Papua New Guinea	3295	4890 5960 5985
		6020	6040 6080 6140
		9520	
1100-1110 S	Port Moresby, Papua New Guinea	3295	4890 5960 5985
		6020	6040 6080 6140
		9520	
1100-1115	Radio New Zealand, Wellington	6100	9540
1100-1120	Radio Pakistan, Islamabad	15606	17760
1100-1125	Radio Netherlands, Hilversum	6020	9675
1100-1130	HCJB, Quito, Ecuador	6130	11925
1100-1130	Radio Finland	11945	15400

1100-1130	Radio Japan, Tokyo	5990	6120 7210 17810
1100-1130	Radio Mozambique, Maputo	9525	11818 11835
1100-1130	Radio Sweden Int'l, Stockholm	6065	9630 21690
1100-1130	SLBC, Colombo, Sri Lanka	11835	15120 17850 [ML]
1100-1130	Swiss Radio Int'l, Berne	13685	15570 17830
1100-1130	Voice of Vietnam, Hanoi	7430	9732
1100-1150	Radio Pyongyang, North Korea	6576	9600 11735
1100-1155	Radio Beijing, China	15455	
1100-1200	ABC, Alice Springs, Australia	2310	[ML]
1100-1200	ABC, Katherine, Australia	2485	
1100-1200	ABC, Perth, Australia	9680	
1100-1200	ABC, Tennant Creek, Australia	2325	[ML]
1100-1200	(US) Armed Forces Radio and TV	6030	9700
1100-1200	BBC, London, England	5965	6195 9510 9740
		11750	11775 12095 15400
		17790	18080
1100-1200	CBN, St. John's, Newfoundland	6160	
1100-1200	CFCF, Montreal, Quebec	6005	
1100-1200	CFCN, Calgary, Alberta	6030	
1100-1200	CHNS, Halifax, Nova Scotia	6130	
1100-1200	CKWX, Vancouver, British Columbia	6080	
1100-1200	CFRB, Toronto, Ontario	6070	
1100-1200	(US) Far East Network, Tokyo	3910	
1100-1200	KYOI, Saipan	11900	
1100-1200	Radio Australia, Melbourne	5995	6080 7215 9580
		9645	9710 9770 11800
1100-1200	Radio Korea, Seoul, South Korea	15575	
1100-1200	Radio Moscow, USSR	9600	9795 12055 13680
		15135	15225 15475
1100-1200	Radio RSA, South Africa	21590	
1100-1200 A,S	Radio Tanzania, Dar es Salaam	7165	
1100-1200 S	Radio Zambia, Lusaka	11880	[IRR]
1100-1200 S	Superpower KUSW, Utah	9850	
1100-1200	Voice of America, Washington	5975	5985 6110 9590
		9760	11715 15160 15425
1100-1200	Voice of Asia, Taiwan	5980	7445
1100-1200	Voice of Kenya, Nairobi	7270	
1100-1200	Voice of Nigeria, Lagos	7255	15120
1100-1200	WHRI, Noblesville, Indiana	5995	11790
1100-1200	WYFR, Oakland, California	5950	7355 9680

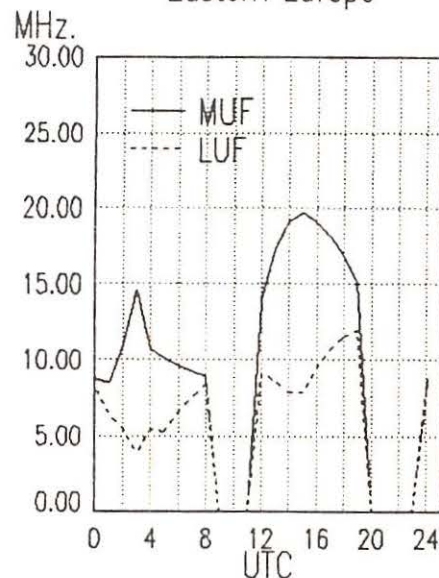
Midwest To
South America



West Coast To
Western Europe



West Coast To
Eastern Europe



frequency SECTION

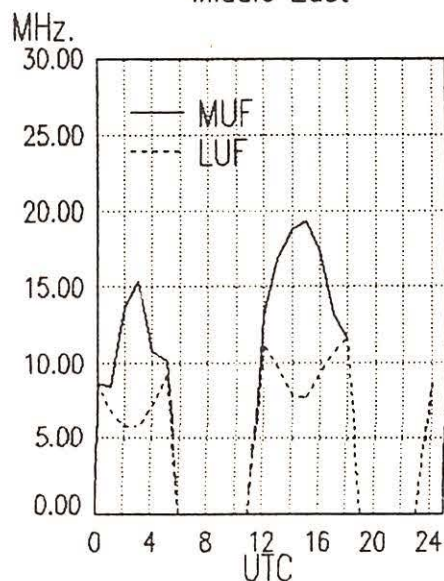
1110-1120	M-F	Radio Botswana, Gaborone	4820	5955	7255
1115-1200		Radio Berlin Int'l, East Germany	15445	17880	21465 21540
1115-1130		Vatican Radio, Vatican City	17840		
1115-1145		Radio Korea, Seoul, South Korea	7275	11740	
1115-1145		Radio Nepal, Kathmandu	5005		
1115-1200		Trans World Radio, Bonaire	11815	15345	
1130-1157		Radio Austria Int'l, Vienna	13730	15320	
1130-1200		Deutsche Welle, West Germany	15410	21600	
1130-1200		HCJB, Quito, Ecuador	11740		
1130-1200		Radio Japan, Tokyo	5990	6120	7210
1130-1200		Radio Netherland, Hilversum	5995	9715	15560 17575
			17605	21480	
1130-1200		Radio Thailand, Bangkok	9655	11905	
1130-1200		Radio Tirana, Albania	9480	11855	
1130-1200		Voice of Islamic Republic Iran	11790		
1135-1140		All India Radio, New Delhi	6065	7110	9610 9675
			11850	15320	
1140-1145	M-A	Vatican Radio, Vatican City	6248	9645	11740
1145-1200		BBC, London, England*	5995	7180	
1145-1200		Radio Bangladesh, Dakha	15255	17740	
1145-1200		Radio Prague, Czechoslovakia	6055	7345	9505

1200 UTC [8:00 AM EDT/5:00 AM PDT]

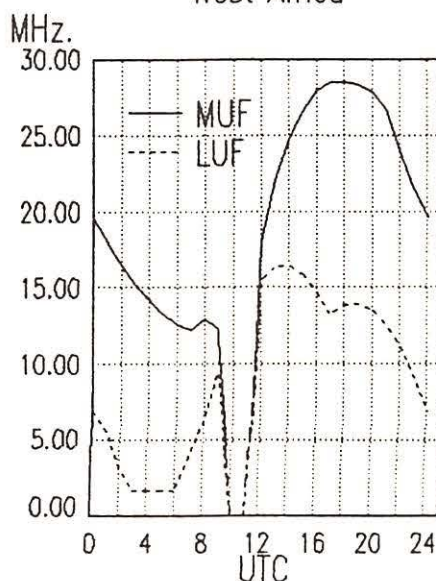
1200-1205	M-A	Port Moresby, Papua New Guinea	3295	4890	5960 6020
			6040	6080	6140 9520
1200-1215		BBC, London, England*	3915	6065	7275
1200-1215		Radio New Zealand, Wellington	6100	9540	
1200-1215		Vatican Radio, Vatican City	15190	17865	
1200-1215		Voice of Kampuchea, Phnom-Penh	9693	11938	
1200-1220		Radio Bucharest, Romania	17720	21665	
1200-1225	M-F	Radio Finland, Helsinki	11945	15400	
1200-1225		Radio Polonia, Warsaw, Poland	6095	7285	
1200-1230	S	Radio Austria Int'l, Vienna	6155	9685	11915 15320
1200-1230		Radio Canada Int'l, Montreal	9625	9650	11855 15385
			15440	17710	17820
1200-1230		Radio Netherland, Hilversum	5995	9715	15560 17575
			17605	21480	

1200-1230		Radio Somalia, Mogadishu	6095		
1200-1230		Radio Tashkent, Uzbek, USSR	5945	7275	9540 9600
			11785		
1200-1230		Radio Thailand, Bangkok	9655	11905	
1200-1230	S	Radio Zambia, Lusaka	11880	[IRR]	
1200-1235	M-A	Radio Ulan Bator, Mongolia	9615	12015	
1200-1236		HCJB, Quito, Ecuador	6075		
1200-1250		Radio Pyongyang, North Korea	9600	9555	11735
1200-1255		Radio Beijing, China	7335	9530	9635 9665
			9770	11600	11715 11755
1200-1300		ABC, Alice Springs, Australia	2310	[ML]	
1200-1300		ABC, Katherine, Australia	2485		
1200-1300		ABC, Tennant Creek, Australia	2325	[ML]	
1200-1300	S	Adventist World Radio, Africa	17890		
1200-1300		(US) Armed Forces Radio and TV	6030	6125	15430
1200-1300		BBC, London, England	5995	6195	9510 9700
			9740	9750	11750 11775
			12095	15070	17790 18080
1200-1300		CBN, St. John's, Newfoundland	6160		
1200-1300		CFCF, Montreal, Quebec	6005		
1200-1300		CFCN, Calgary, Alberta	6030		
1200-1300		CHNS, Halifax, Nova Scotia	6130		
1200-1300		CKWX, Vancouver, British Columbia	6080		
1200-1300		CFRB, Toronto, Ontario	6070		
1200-1300		(US) Far East Network, Tokyo	3910		
1200-1300		HCJB, Quito, Ecuador	11740	15115	17890
1200-1300		KYOI, Salpan	11900		
1200-1300		Radio Australia, Melbourne	5995	6060	6080 7205
			7215	9580	9710 11800
			9600	9795	12055 13680
1200-1300		Radio Moscow, USSR	15135	15225	15595
1200-1300		Radio RSA, South Africa	21590		
1200-1300	A,S	Radio Tanzania, Dar es Salaam	7165		
1200-1300		SBC Radio One, Singapore	5010	5052	11940
1200-1300	S	Superpower KUSW, Utah	9850		
1200-1300		Swiss Radio Int'l, Bern	12030		
1200-1300		Trans World Radio, Bonaire	11815	15345	
1200-1300		Trans World Radio, Sri Lanka	11920		
1200-1300		Voice of America, Washington	6110	9760	11715 15160
			15425		

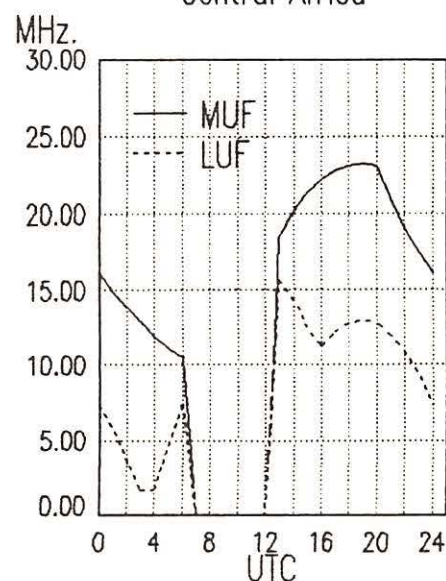
West Coast To
Middle East



West Coast To
West Africa



West Coast To
Central Africa



frequency SECTION

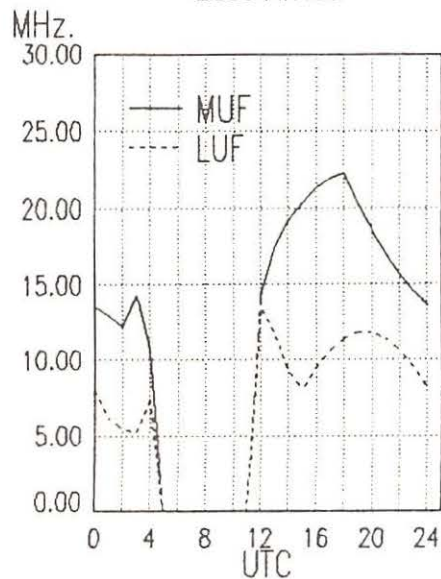
1200-1300	Voice of Kenya, Nairobi	7270			
1200-1300	Voice of Nigeria, Lagos	7255	15120		
1200-1300	WCSN, Boston, Massachusetts	5980			
1200-1300	WHRI, Noblesville, Indiana	5995	11715		
1200-1300	WYFR, Oakland, California	5950	6105		
1200-1300	WYFR Satellite Net, California	13695			
1215-1300	Radio Berlin Int'l, E. Germany	15445	17880	21465	21540
1215-1300	Radio Cairo, Egypt	17595	17675		
1230-1235	All India Radio, New Delhi	3905	4800	4920	7280
		9565	9615	11620	11735
		15120			
1230-1245	Radio Korea, Seoul, South Korea	7275	11740		
1230-1255	Radio Austria Int'l, Vienna	6155	9685	11915	15320
1230-1300	BBC, London, England*	6125	7255	6195	9635
		9660	11780	12040	15270
		15390	15435	17695	
1230-1300	Radio Bangladesh, Dhaka	11750	15525		
1230-1300	Radio Canada Int'l, Montreal	9625	9650	11855	15440
		17820			
1230-1300	Radio Sweden, Stockholm	15190	15430		
1240-1250 M	Radio Free Europe, Munich*	5985	7115	9695	9725
		11895	15355		
1245-1255	Radio France Int'l, Paris	11670	17720		
1245-1300	Radio Berlin Int'l, E. Germany	9665	11705	11785	15170
		15240			

1300 UTC [9:00 AM EDT/6:00 AM PDT]

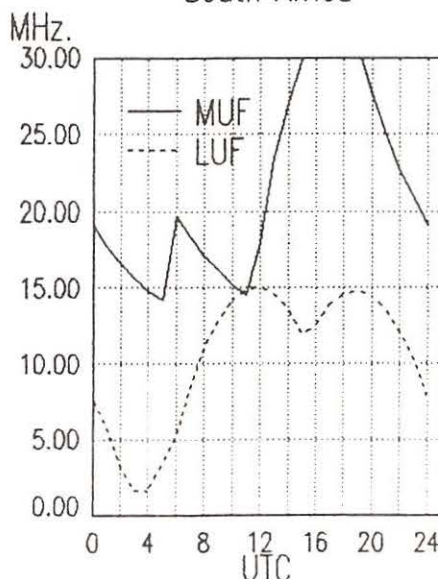
1300-1305	Port Moresby, Papua New Guinea	3295	4890	5960	5980
		6020	6040	6080	6140
		9520			
1300-1315	Radio Berlin Int'l, East Germany	21465	21540		
1300-1325	Radio Bucharest, Romania	9690	11940	15405	17720
1300-1330	BBC, London, England	5995	6195	7180	9510
		9740	9750	11750	11775
		17790			
1305-1330 S	Radio Austria Int'l, Vienna	15320			
1300-1330	Radio Berlin Int'l, E. Germany	9665	11705	11785	15170
		15240			

1300-1330	Radio Cairo, Egypt	17595			
1300-1330	Radio Finland, Helsinki	11945	15400		
1300-1330	Radio Ghana, Accra	4915	7295		
1300-1330 S	Radio Norway Int'l, Oslo	15310			
1300-1330	Swiss Radio Int'l, Berne	11965			
1300-1330	Trans World Radio, Sri Lanka	11920			
1300-1330	Voice of Kenya, Nairobi	7270			
1300-1332 A.S	Trans World Radio, Bonaire	11815	15345		
1300-1350	Radio Pyongyang, North Korea	9325	9345	9555	9600
		11735			
1300-1355	Radio Beijing, China	11600	11755	15280	15455
1300-1400	ABC, Alice Springs, Australia	2310	[ML]		
1300-1400	ABC, Katherine, Australia	2485			
1300-1400	ABC, Tennant Creek, Australia	2325	[ML]		
1300-1400	(US) Armed Forces Radio and TV	9700	15330	15430	
1300-1400	CBC Northern Quebec Service	9625	11720		
1300-1400	CBN, St. John's, Newfoundland	6160			
1300-1400	CBU, Vancouver, British Columbia	6160			
1300-1400	CFCF, Montreal, Quebec	6005			
1300-1400	CFCN, Calgary, Alberta	6030			
1300-1400	CHNS, Halifax, Nova Scotia	6130			
1300-1400	CKWX, Vancouver, British Columbia	6080			
1300-1400	CFRB, Toronto, Ontario	6070			
1300-1400 S	ELWA, Monrovia, Liberia	11830			
1300-1400	(US) Far East Network, Tokyo	3910			
1300-1400	FEBC, Manila, Philippines	11850			
1300-1400	HCJB, Quito, Ecuador	11740	15115	17890	
1300-1400 M-A	KYOI, Saipan	11900			
1300-1400	Radio Australia, Melbourne	5995	6060	6080	7205
		9580			
1300-1400 S	Radio Canada Int'l, Montreal	9625	11720	11955	15440
		17820			
1300-1400	Radio Jordan, Amman	9560			
1300-1400	Radio Korea, Seoul	9570	9750	15575	
1300-1400	Radio Moscow, USSR	5920	6167.8	LSB 9655	
		9825	9895	11840	11655
		11900	11930	13680	
1300-1400 A.S	Radio Tanzania, Dar es Salaam	7165			
1300-1400	SBC Radio One, Singapore	5010	5052	11940	
1300-1400 S	Superpower KUSW, Utah	9850			

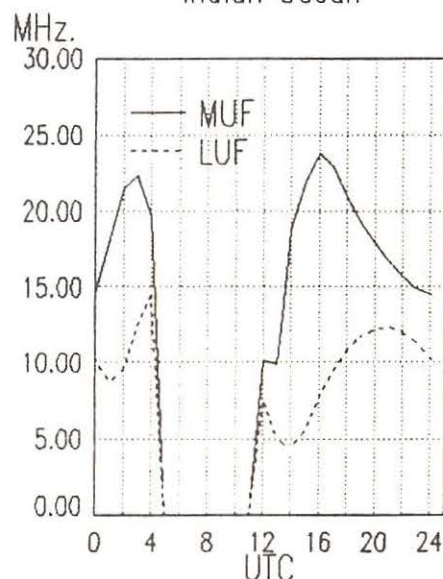
West Coast To
East Africa



West Coast To
South Africa



West Coast To
Indian Ocean

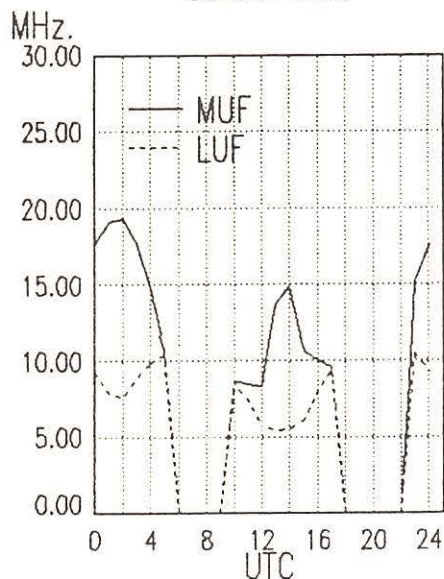


frequency SECTION

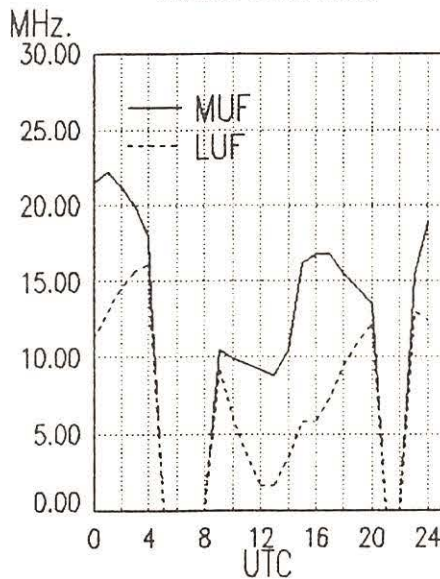
1300-1400	Voice of America, Washington	6110	9760	15160	15425	1400-1430	Radio Finland, Helsinki	11755	15185	17800
1300-1400	Voice of Malaysia	7295				1400-1430	S Radio Norway Int'l, Oslo	21705		
1300-1400	Voice of Nigeria, Lagos	7255	15120			1400-1430	Radio Peace and Progress, USSR	17645	17765	
1300-1400	WCSN, Boston, Massachusetts	5980				1400-1430	Radio Polonia, Warsaw, Poland	6095	7285	
1300-1400	WHRI, Noblesville, Indiana	9455	11790			1400-1430	Radio Sweden, Stockholm	15345	15390	
1300-1400	WYFR, Oakland, California	5950	7355	9565		1400-1430	Radio Tirana, Albania	9500	11985	
1300-1400	WYFR Satellite Net, California	13695	15215			1400-1430	Voice of Ethiopia, Addis Ababa	9550	11710	
1305-1315	Radio France Int'l, Paris	6175	9790	9805	11670	1400-1430	Voice of Republic of Iran	15085		
		11845	15155	15195	15300	1400-1450	T Radio Free Europe, Munich*	5985	7115	7695 9725
		15315	15365	17620	17720			11895	15355	
		17850	21645			1400-1450	Radio Pyongyang, North Korea	6576	11735	
1330-1355	M-A BRT, Brussels, Belgium	15510	15590			1400-1455	Radio Beijing, China	11600	15165	
1330-1355	Radio Austria Int'l, Vienna	15320				1400-1500	ABC, Katherine, Australia	2485		
1330-1400	BBC, London, England	5995	6195	7180	9510	1400-1500	ABC, Perth, Australia	9610		
		9740	11775	12095	15070	1400-1500	Adventist World Radio, Italy	7275		
		21470				1400-1500	All India Radio, New Delhi	9545	11810	15335
1330-1400	All India Radio, New Delhi	9545	10330	11810	15335	1400-1500	(US) Armed Forces Radio and TV	9700	15330	15430
1330-1400	M-A Bhutan Bcasing Service, Thimpu	6035				1400-1500	BBC, London, England	5995	6195	7180 9740
1330-1400	Laotian National Radio	7113						9750	11750	12095 15070
1330-1400	Radio Finland, Helsinki	11945	15400					15260	17705	17790 21710
1330-1400	Radio Korea, Seoul, South Korea	7275						21470		
1330-1400	Radio Tashkent, Uzbek, USSR	5945	7275	9540	9600	1400-1500	CBN, St. John's, Newfoundland	6160		
		11785				1400-1500	CBC Northern Quebec Service	9625	11720	
1330-1400	Swiss Radio Int'l, Berne	11695	13685	15135	15570	1400-1500	M-A CBU, Vancouver, British Columbia	6160		
		17830	21695			1400-1500	CFCF, Montreal, Quebec	6005		
1330-1400	UAE Radio, United Arab Emirates	17865	21605			1400-1500	CFCN, Calgary, Alberta	6030		
1330-1400	Voice of Islamic Republic Iran	9525	9685	9770		1400-1500	CHNS, Halifax, Nova Scotia	6130		
1330-1400	Voice of Kenya, Nairobi	6100				1400-1500	CKWX, Vancouver, British Columbia	6080		
1330-1400	Voice of Turkey, Ankara	15255				1400-1500	CFRB, Toronto, Ontario	6070		
						1400-1500	S ELWA, Monrovia, Liberia	11830		
1330-1400	Voice of Vietnam, Hanoi	9840	15010			1400-1500	(US) Far East Network, Tokyo	3910		
1332-1400	A Trans World Radio, Bonaire	11815	15345			1400-1500	FEBC, Manila, Philippines	9670	11850	
						1400-1500	HCJB, Quito, Ecuador	11740	15115	17890
						1400-1500	KNLS, Anchor Point, Alaska	9750		
						1400-1500	KYOI, Saipan	11900		
						1400-1500	Radio Australia, Melbourne	5995	6035	6060 6080
								7205	9580	
1400-1427	Voice of Nigeria, Lagos	15120				1400-1500	S Radio Canada Int'l, Montreal	11955	17820	
1400-1430	ABC, Alice Springs, Australia	2310 [ML]				1400-1500	Radio Japan, Tokyo	9695	11815	
1400-1430	ABC, Tennant Creek, Australia	2325 [ML]				1400-1500	Radio Jordan, Amman	9560		

1400 UTC [10:00 AM EDT/6:00 AM PDT]

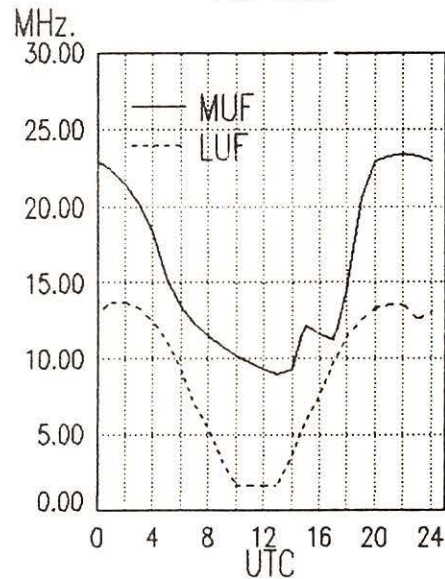
West Coast To
Central Asia



West Coast To
South East Asia



West Coast To
Far East



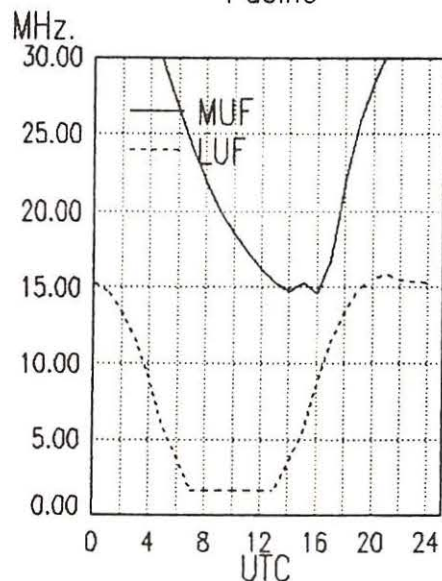
frequency SECTION

1400-1500	Radio Moscow, USSR	5920 6067.8 LSB 7110
		7300 7370 9655 9825
		9895 11840 12005 12025
		12055 13680 15135
1400-1500	Radio RSA, South Africa	21590
1400-1500 A,S	Radio Tanzania, Dar es Salaam	7165
1400-1500	SBC Radio One, Singapore	5010 5052 11940
1400-1500 S	Superpower KUSW, Utah	9850
1400-1500	Voice of America, Washington	9645 9760 11920 15160
		15425
1400-1500	Voice of Kenya, Nairobi	6100
1400-1500	Voice of Malaysia, Kuala Lumpur	4950
1400-1500	Voice of Nigeria, Lagos	7255
1400-1500	WCSN, Boston, Massachusetts	13760
1400-1500	WHRI, Noblesville, Indiana	9455 11790
1400-1500 S	WRNO, New Orleans, Louisiana	11965
1400-1500	WYFR, Oakland, California	5950 9535 11830 15215
1400-1500	WYFR Satellite Net	13695
1415-1420	Radio Nepal, Kathmandu	3230 5005
1415-1500	Radio Berlin Int'l, East Germany	15240 17880
1430-1500 F	ABC, Alice Springs, Australia	2310 [ML]
1430-1500 F	ABC, Tennant Creek, Australia	2325 [ML]
1430-1500	Burma Broadcasting Service	5985
1430-1500	King of Hope, Southern Lebanon	6280
1430-1500	KTWR, Agana, Guam	9780
1430-1500	Radio Australia, Melbourne	6060 9580
1430-1500	Radio Netherlands, Hilversum	11740 13770 15560 17575
1430-1500	Radio Prague, Czechoslovakia	9605 11685 13715 15110
		15155 17705 21505
1430-1500	Radio Sofia, Bulgaria	7245 9740 11735
1430-1500	Radio Yugoslavia, Belgrade	7240 15240 15415
1430-1500	WYFR, Okeechobee, Florida	15055
1445-1500	Radio Berlin Int'l, East Germany	11785 15170 15255
1445-1500 M-F	Radio Canada Int'l, Montreal	11915 11935 15160 15325
		15305 17820
1445-1500 M-A	Radio Ulan Bator, Mongolia	9575 15305

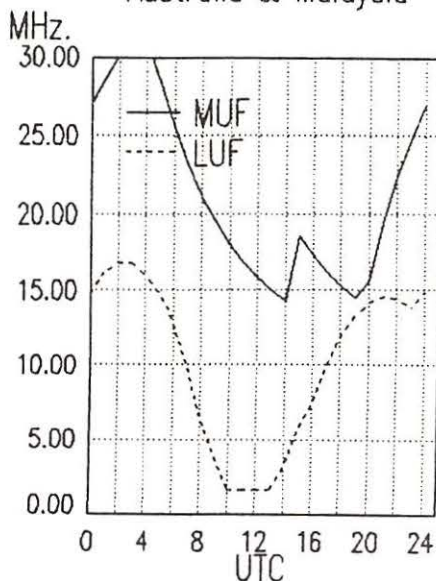
1500 UTC [11:00 AM EDT/7:00 AM PDT]

1500-1505	Africa No. 1, Gabon	7200 15200
1500-1510	Vatican Radio, Vatican City	11960 15090 17870
1500-1515	FEBA, Mahe, Seychelles	15325
1500-1520	Radio Ulan Bator, Mongolia	9575 15305
1500-1525	Radio Bucharest, Romania	9510 9690 11775 11940
		15250 15335
1500-1525	Radio Netherlands, Hilversum	11740 13770 15560 17575
1500-1530	Radio Berlin Int'l, East Germany	11785 15170 15255
1500-1530	Radio Sofia, Bulgaria	7245 9560 11735 15310
1500-1530 A,S	Radio Tanzania, Dar es Salaam	7165
1500-1530	Radio Veritas Asia, Philippines	9770 15215
1500-1550	Deutsche Welle, West Germany	7225 9735 17765 15135
		21600
1500-1550	KTWR, Agana, Guam	9820
1500-1550	Radio Pyongyang, North Korea	6576 9325 9345 9640
		9977
1500-1555	Radio Beijing, China	11600 15165
1500-1600 F	ABC, Alice Springs, Australia	2310 [ML]
1500-1600	ABC, Perth, Australia	9610
1500-1600 F	ABC, Tennant Creek, Australia	2325 [ML]
1500-1600	(US) Armed Forces Radio and TV	9700 15330 15430
1500-1600	AWR, Alajuela, Costa Rica	15460
1500-1600	BBC, London, England	9740 12095 15070 15260
		15400 17705 17790 17830
		17885
1500-1600	Burma Broadcasting Service	5985
1500-1600	CBC Northern Quebec Service	9625 11720
1500-1600	CBN, St. John's, Newfoundland	6160
1500-1600	CBU, Vancouver, British Columbia	6160
1500-1600	CFCF, Montreal, Quebec	6005
1500-1600	CFCN, Calgary, Alberta	6030
1500-1600	CHNS, Halifax, Nova Scotia	6130
1500-1600	CKWX, Vancouver, British Columbia	6080
1500-1600	CFRB, Toronto, Ontario	6070
1500-1600 S	ELWA, Monrovia, Liberia	11830
1500-1600	(US) Far East Network, Tokyo	3910

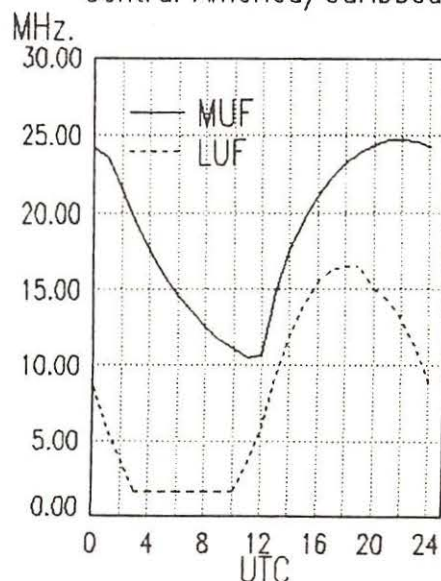
West Coast To
Pacific



West Coast To
Australia & Malaysia



West Coast To
Central America/Caribbean



frequency SECTION

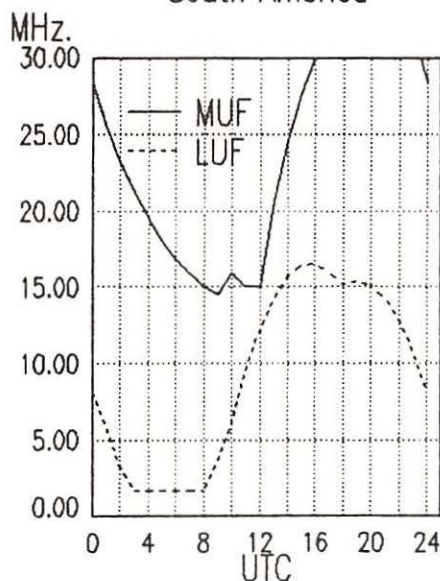
1500-1600	FEBC, Manila, Philippines	11850
1500-1600	HCJB, Quito, Ecuador	11740 11810 15115 17890
1500-1600	King of Hope, Southern Lebanon	6280
1500-1600	KNLS, Anchor Point, Alaska	9750
1500-1600	KSDA, Agat, Guam	11980
1500-1600	KYOI, Saipan	11900
1500-1600	Radio Australia, Melbourne	5995 6035 6060 6080
		7205 7215 9580
1500-1600 S	Radio Canada Int'l, Montreal	9555 9625 11720 11915
		11955 15315 15440 17820
1500-1600	Radio Japan, Tokyo	9505 9695 11815 21700
1500-1600	Radio Jordan, Amman	9560
1500-1600	Radio Moscow, USSR	6067.8 LSB 9655 9825
		11840 11900 12005 13680
		15135
1500-1600	Radio RSA, South Africa	9655 15125 17755 21590
1500-1600	SBC Radio One, Singapore	5010 5052 11940
1500-1600 S	Superpower KUSW, Utah	9850
1500-1600	Voice of America, Washington	9575 9700 9760 15205
1500-1600	Voice of Ethiopia, Addis Ababa	7165 9560
1500-1600	Voice of Indonesia, Jakarta	11790 15150
1500-1600	Voice of Kenya, Nairobi	6100
1500-1600	Voice of Malaysia, Kuala Lumpur	4950
1500-1600	Voice of Nigeria, Lagos	7255 11770
1500-1600	WCSN, Boston, Massachusetts	13760
1500-1600	WHRI, Noblesville, Indiana	15105 21655
1500-1600	WRNO, New Orleans, Louisiana	11965
1500-1600	WYFR, Oakland, California	5950 9535 11830 13695
		15215 17612
1515-1600	Radio Berlin Int'l, East Germany	6115 7295 9730
1515-1600	FEBA, Mahe, Seychelles	11865 15325
1530-1545	All India Radio, New Delhi	3905 3925 4860 6160
		7160 7412 9545 9950
1530-1600	Radio Prague, Czechoslovakia	6055 7345 9605 11665
		11685 11990 15110 13715
		17705 21505
1530-1600	Radio Tanzania, Dar es Salaam	9684
1530-1600	Radio Tirana, Albania	9480 11835
1530-1600	Swiss Radio Int'l, Berne	17830 13685 21630
1530-1600	Voice of Asia, Taiwan	5980 7445

1530-1600	Voice of Nigeria, Lagos	15120
1540-1550 M-A	Voice of Greece, Athens	9855 11645 15630
1545-1600	Radio Canada Int'l, Montreal	9555 11915 11935 15315
		15325 17820
1545-1600	Radio Korea, Seoul, South Korea	7275 9870
1545-1600	Vatican Radio, Vatican City	11810 15120 17730
1550-1600 H-S	KTWR, Agana, Guam	9780

1600 UTC [12:00 PM EDT/9:00 AM PDT]

1600-1610	FEBA, Mahe, Seychelles	11865 15325
1600-1610	Radio Lesotho, Maseru	4800
1600-1610	SBC Radio One, Singapore	5010 5052 11940
1600-1625	Radio Budapest, Hungary	6110 9585 9835 11910
		15160
1600-1625	Radio Prague, Czechoslovakia	6055 7345 9605 11665
		11685 11990 15110 13715
		15110 17705 21505
1600-1630	ELWA, Monrovia, Liberia	11830
1600-1630 S	Radio Norway Int'l, Oslo	15220 15310
1600-1630	Radio Pakistan, Islamabad	7365 9465 9785 11615
		11625 15125
1600-1630	Radio Polonia, Warsaw, Poland	6135 9540
1600-1630 M-F	Radio Portugal, Lisbon	15245
1600-1630	Radio Sweden, Stockholm	6065 11855
1600-1630	SLBC, Colombo, Sri Lanka	6075 9720
1600-1630	Trans World Radio, Swaziland	5055 9525
1600-1630	Voice of Asia, Taiwan	5980 7445
1600-1630	Voice of Vietnam, Hanoi	9840 15010
1600-1645 H-A	KTWR, Agana, Guam	9820
1600-1645	Radio Nacional Angola, Luanda	7245 9535 11955
1600-1645	UAE Radio, United Arab Emirates	11955 15320 15435 17865
1600-1655	Radio Beijing, China	9570 11600 11715
1600-1700 F	ABC, Alice Springs, Australia	2310 [ML]
1600-1700	ABC, Perth, Australia	9610
1600-1700 F	ABC, Tennant Creek, Australia	2325 [ML]
1600-1700	(US) Armed Forces Radio and TV	9700 15330 15430
1600-1700	AWR, Alajuela, Costa Rica	15460
1600-1700	BBC, London, England	9740
		11750 11775 12095 15070
		15260 15400 17880
1600-1700	CBC Northern Quebec Service	9625 11720
1600-1700	CBN, St. John's, Newfoundland	6160
1600-1700	CBU, Vancouver, British Columbia	6160
1600-1700	CFCF, Montreal, Quebec	6005
1600-1700	CFCN, Calgary, Alberta	6030
1600-1700	CHNS, Halifax, Nova Scotia	6130
1600-1700	CKWX, Vancouver, British Columbia	6080
1600-1700	CFRB, Toronto, Ontario	6070
1600-1700	(US) Far East Network, Tokyo	3910
1600-1700 S	KCBI, Dallas, Texas	11735
1600-1700	Superpower KUSW, Utah	15225
1600-1700	Radio Australia, Melbourne	5995 6035 6060 6080
		7205 7215 9580
1600-1700	Radio Beijing, China	15130
1600-1700	Radio France Int'l, Paris	11705 15360 17620
1600-1700	Radio Jordan, Amman	9560
1600-1700	Radio Korea, Seoul, South Korea	5975 9870
1600-1700	Radio Malawi, Blantyre	3380 5995
1600-1700	Radio Moscow, USSR	9825 9875 11840 11950
		12005 12015 11995 15135
1600-1700	Radio Riyadh, Saudi Arabia	9705 9720
1600-1700	Radio RSA, South Africa	11890
1600-1700	Radio Tanzania, Dar es Salaam	9684
1600-1700	Voice of America, Washington, DC	9575 9645 9760 11920
		15410 15445 15205 15580
		15560 17820 17785 17870
1600-1700	WCSN, Boston, MA	21640
1600-1700	WHRI, Noblesville, Indiana	15105 21655
1600-1700 S	WRNO, Louisiana	11965
1600-1700	WYFR Satellite Net	13695 15566
1600-1700	WYFR, Okeechobee, Florida	9535 11830 15170 15215

West Coast To
South America



frequency SECTION

1600-1700	Radio Zambia, Lusaka	9580		
1615-1630	Voice of Vietnam, Hanoi	10011		
1630-1655 M-A	BRT, Brussels, Belgium	17595	21810	
1630-1700	Radio Netherlands, Hilversum	6020	9540	
1630-1700	RTM Morocco	17595	17815	

1700 UTC [1:00 PM EDT/10:00 AM PDT]

1700-1705	Radio Uganda, Kampala	4976	5026	
1700-1715	Kol Israel, Jerusalem	9385	9640	9925 11585
1700-1715 M-A	Voice of Namibia (Angola)	11955		
1700-1725	Radio Netherland, Hilversum	6020	9590	
1700-1730	Radio Australia, Melbourne	5995	6060 6080	7205
		9580		
1700-1730	Radio Berlin Int'l, East Germany	6115	7260	9730
1700-1730	Radio Japan, Tokyo	9505	11705	11815
1700-1730 S	Radio Norway Int'l, Oslo	9655	15220	15310
1700-1730	Radio Sweden Int'l, Oslo	6065		
1700-1730	Swiss Radio Int'l, Berne	3985	6165	9535
1700-1745	BBC, London, England	9410	9740	11750 11775
		12095	15070	15260 15400
1700-1750	Radio Pyongyang, North Korea	7290	9325	9640 9977
1700-1755	Radio Beijing, China	9570	11600	
1700-1800 F	ABC, Alice Springs, Australia	2310 [ML]		
1700-1800	ABC, Tennant Creek, Australia	2325 [ML]		
1700-1800	(US) Armed Forces Radio and TV	9700	15330	15430
1700-1800	AWR Africa, Gabon	9625		
1700-1800	CBC Northern Quebec Service	9625	11720	
1700-1800	CBN, St. John's, Newfoundland	6160		
1700-1800	CBU, Vancouver, British Columbia	6160		
1700-1800	CFCF, Montreal, Quebec	6005		
1700-1800	CFCN, Calgary, Alberta	6030		
1700-1800	CHNS, Halifax, Nova Scotia	6130		
1700-1800	CKWX, Vancouver, British Columbia	6080		
1700-1800	CFRB, Toronto, Ontario	6070		
1700-1800	(US) Far East Network, Tokyo	3910		
1700-1800 A,S	KCBI, Dallas, Texas	11735		
1700-1800	Radio Havana Cuba	11920		
1700-1800	Radio Jordan, Amman	9560		
1700-1800 M-F	Radio Malabo, Equatorial Guinea	9553 [ML]		
1700-1800	Radio Moscow, USSR	9580	9825	9875 11750
		11840	11900	11930 11950
		11995	12005	12030 12050
		15135	15475	
1700-1800	Radio Riyadh, Saudi Arabia	9705	9720	
1700-1800	Radio Tanzania, Dar es Salaam	9684		
1700-1800	Radio Zambia, Lusaka	9580		
1700-1800	RTM Morocco	17815		
1700-1800	SBC Radio One, Singapore	5052	11940	
1700-1800 A,S	Swaziland Commercial Radio	6155		
1700-1800 M-A	Superpower KUSW, Utah	15225		
1700-1800	Voice of Africa, Egypt	15255		
1700-1800	Voice of America, Washington	9575	11920	15410 15445
		15580	15600	17785 17800
		17870		
1700-1800	Voice of Kenya, Nairobi	6100		
1700-1800	Voice of Nigeria, Lagos	11770		
1700-1800	WCSN, Boston, Massachusetts	21640		
1700-1800	WHRI, Noblesville, Indiana	15105		
1700-1800	WINB, Red Lion, Pennsylvania	15295		
1700-1800 S-F	WMLK, Bethel, Pennsylvania	9465		
1700-1800	WRNO, New Orleans, Louisiana	15420		
1700-1800	WYFR, Oakland, California	9535	11830	13695 15215
		15170	15375	
1700-1800	WYFR Satellite Net, California	13760		
1715-1730	Radio Korea, Seoul, South Korea	9870	15575	
1715-1745	BBC, London, England*	3975	6185	7165
1718-1800	Radio Pakistan, Islamabad	6210	7835	
1725-1740	Radio Suriname Int'l, Paramibo	7835v		
1725-1800	Radio New Zealand, Wellington	11780	15150	
1730-1735	All India Radio, New Delhi	4840	4860	4920 6160
		7412	9950	
1730-1755	BRT Brussels, Belgium	5910	11695	

1730-1800	KNLS, Anchor Point, Alaska	7355		
1730-1755	Radio Bucharest, Romania	7105	9530	9685 11790
		11940		
1730-1800	Radio Australia, Melbourne	5995	6035	6060 6080
		7205	9580	
1730-1800	Radio Berlin Int'l, E. Germany	6115	7260	9730
1730-1800	Radio Polonia, Warsaw, Poland	6135	9540	
1730-1800	Radio Prague, Czechoslovakia	13715	15165	
1730-1800	Radio Sofia, Bulgaria	7245	9560	11735 15310
1730-1800	Radio Yugoslavia, Belgrade	5980	6100	7240 11735
1730-1800	RAE, Buenos Aires, Argentina	15345		
1734-1800	FEBA, Mahe, Seychelles	11760		
1745-1800	BBC, London, England	9515	9740	15070 15260
		15400		
1745-1800	SLBC, Colombo, Sri Lanka	11800		

1800 UTC [2:00 PM EDT/11:00 AM PDT]

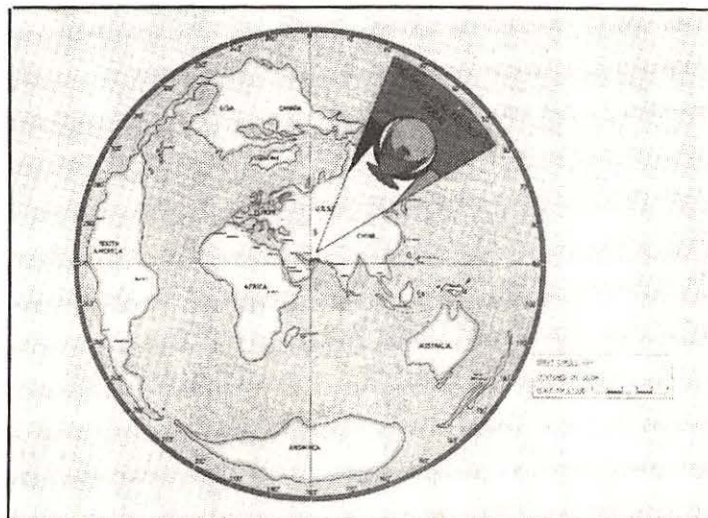
1800-1805 A	SBC Radio One, Singapore	11940		
1800-1815	Radio Cameroon, Yaounde	3970	4750	4795 4850
		5010		
1800-1815	SLBC, Colombo, Sri Lanka	11800		
1800-1825 A,S	FEBA, Mahe, Seychelles	11760		
1800-1825	Radio Prague, Czechoslovakia	9605	11685	11990 13715
		15110	21505	
1800-1825	RAE, Buenos Aires, Argentina	15345		
1800-1830	BBC, London, England	9740	11750	12095 15070
		15400		
1800-1830 S	Radio Bamako, Mali	4835	5995	
1800-1830	Radio Canada Int'l, Montreal	15260	17820	
1800-1830	Radio Mozambique, Maputo	3265	4855	9618
1800-1830	Radio Prague, Czechoslovakia	5930	7345	13715
1800-1830	Radio Sofia, Bulgaria	7245	7155	9700
1800-1830	Voice of Africa, Egypt	15255		
1800-1830	Voice of Vietnam, Hanoi	9840	15010	
1800-1845	Radio Abidjan, Ivory Coast	7215		
1800-1845	Trans World Radio, Swaziland	9525		
1800-1850	Deutsche Welle, West Germany	11785	13790	15135 17715
1800-1850	Radio Bras, Brasilia, Brazil	15265		
1800-1856	Radio RSA, South Africa	17880		
1800-1900 F	ABC, Alice Springs, Australia	2310 [ML]		
1800-1900 F	ABC, Tennant Creek, Australia	2325 [ML]		
1800-1900	All India Radio, New Delhi	11935	15360	
1800-1900	(US) Armed Forces Radio and TV	9700	15330	15430
1800-1900	CBC Northern Quebec Service	9625	11720	
1800-1900	CBN, St. John's, Newfoundland	6160		
1800-1900	CBU, Vancouver, British Columbia	6160		
1800-1900	CFCF, Montreal, Quebec	6005		
1800-1900	CFCN, Calgary, Alberta	6030		
1800-1900	CHNS, Halifax, Nova Scotia	6130		
1800-1900	CKWX, Vancouver, British Columbia	6080		
1800-1900	CFRB, Toronto, Ontario	6070		
1800-1900	(US) Far East Network, Tokyo	3910		
1800-1900 A,S	KCBI, Dallas, Texas	11735		
1800-1900	KNLS, Anchor Point, Alaska	11650		
1800-1900	Radio Australia, Melbourne	5995	6035	6060 6080
		7205	7215	9580
1800-1900	Radio Jamahiriya, Libya	15450		
1800-1900	Radio Korea, Seoul, South Korea	9870	15575	
1800-1900	Radio Kuwait, Kuwait	11665		
1800-1900	Radio Malabo, Equatorial Guinea	9553v [ML]		
1800-1900	Radio Moscow, USSR	9580	9875	11840 11995
		12030	12050	15135 15475
1800-1900	Radio New Zealand, Wellington	11780	15150	
1800-1900	Radio Riyadh, Saudi Arabia	9705	9720	
1800-1900	Radio Tanzania, Dar es Salaam	9684		
1800-1900	Radio Zambia, Lusaka	9580		
1800-1900 M-A	Superpower KUSW, Utah	15225		
1800-1900 A,S	Swaziland Commercial Radio	6155		
1800-1900	Voice of America, Washington	9575	11920	15410 15445
		15580	15600	17785 17800
		17870	21485	
1800-1900	Voice of Kenya, Nairobi	6100		

frequency SECTION

1800-1900	Voice of Nigeria, Lagos	11770	15120
1800-1900	WCSN, Boston, Massachusetts	15390	
1800-1900	WHRI, Noblesville, Indiana	13760	17830
1800-1900	WINB, Red Lion, Pennsylvania	15295	
1800-1900 S-F	WMLK, Belhel, Pennsylvania	9465	
1800-1900	WRNO, New Orleans, Louisiana	15420	
1800-1900	WYFR, Oakland, California	15170	15215 15375
1800-1900	WYFR Satellite Net, California	11830	13695
1815-1900	Radio Bangladesh, Dhaka	6240	7505
1830-1855	Radio Austria Int'l, Vienna	5945	6155 11825 12015
1830-1855	BRT, Brussels, Belgium	5910	9860 11695
1800-1855	Radio Polonia, Warsaw, Poland	5995	6135 7125 7285
		9525	11840
1830-1900	BBC, London, England	12095	15070 15400
1830-1900	Radio Budapest, Hungary	6110	7220 9585 9835
		11910	15160
1830-1900 A.S	Radio Canada Int'l, Montreal	15260	17820

1830-1900	Radio Finland, Helsinki	6120	9550 11755 15185
1830-1900	Radio Havana Cuba	11800	
1830-1900	Radio Kuwait	11665	
1830-1900 MWF	Radio Mozambique, Maputo	3265	4855 9618
1830-1900	Radio Netherland, Hilversum	6020	9540 17605 21685
1830-1900	Radio Sofia Bulgaria	9700	11720
1830-1900	Radio Sweden, Stockholm	15240	
1830-1900	WINB, Red Lion, Pennsylvania	15185	
1840-1850 M-A	Voice of Greece, Athens	11645	12045 15630
1840-1900	Radio Senegal, Dakar	4950	
1845-1855	Radio Nacional, Conaky, Guinea	4833	4900 7125
1845-1900	All India Radio, New Delhi	7412	11620
1855-1900	Africa No. 1, Gabon	4830	15475

Steve Mindy of East Amherst, New York, sent us this QSL from United Arab Emirates in Dubai, plus a photocopy of their frequencies. Marshall Watson of Ft. Walton Beach, Florida, also has a slightly different version of their QSL (below).



U. A. E. RADIO & TELEVISION DUBAI.

FREQUENCY SCHEDULE - EXTERNAL SERVICES - JUNE, 88.

NORTH AMERICA	-	0330 UTC.	11940,	15435,	17890,	21700 KHZ.
FAR EAST AREA.	-	0530 UTC.	15435,	17775,	17830,	21700 KHZ.
EUROPEAN AREA.	-	1030 UTC. & 1330 UTC.				
			11955,	15435,	17865,	21605 KHZ.
		1500 UTC.				
			9550,	11730,	11955,	15300 KHZ.

GENERAL.

In the English Service we feature general interest programme on Arab History and Culture. We have a Mailbag programme which is broadcast fortnightly on Saturday and Sunday. In this programme we discuss your letters and reports and answer your queries. Please address your letters to :-

EXTERNAL SERVICES, U. A. E. RADIO, DUBAI.

P. O. BOX 1695,

DUBAI,

UNITED ARAB EMIRATES.

Good listening and best wishes from the Sunshine Station - U. A. E. Radio from Dubai.



frequency SECTION

1900 UTC [3:00 PM EDT/12:00 PM PDT]

1900-1903	Africa No. 1, Gabon	15475		
1900-1903	Vatican Radio, Vatican City	6190	7250	9645
1900-1915	Radio Bangladesh, Dhaka	6240	7505	
1900-1915	Radio Tanzania, Dar es Salaam	9684		
1900-1925	Radio Netherlands, Hilversum	6020	15175	17605 21685
1900-1925	Voice of Islamic Republic Iran	9695		
1900-1930	F ABC, Alice Springs, Australia	2310	[ML]	
1900-1930	F ABC, Tennant Creek, Australia	2325	[ML]	
1900-1930	Kol Israel, Jerusalem	11605	13625	15485 15592
1900-1930	Radio Afghanistan, Kabul	7160	9640	
1900-1930	Radio Berlin Int'l, East Germany	9665	11920	15255
1900-1930	Radio Japan, Tokyo	9505	11705	
1900-1930	Radio Kiev, Ukraine, USSR	6010	6090	6165 7170
1900-1930	S Radio Norway Int'l, Oslo	9590	15220	15310
1900-1930	M-F Radio Portugal, Lisbon	11870	15250	
1900-1930	Radio Sofia, Bulgaria	7245	9560	11735 15310
1900-1930	Radio Yugoslavia, Belgrade	5980	7240	9620
1900-1930	Voice of Vietnam, Hanoi	12020	15010	
1900-1955	Radio Beijing, China	6860	9470	
1900-2000	All India Radio, New Delhi	7412	11620	11935 15360
1900-2000	(US) Armed Forces Radio and TV	9700	15330	15430
1900-2000	BBC, London, England	9410	15400	12095 15070
1900-2000	CBC Northern Quebec Service	9625	11720	
1900-2000	CBN, St. John's, Newfoundland	6160		
1900-2000	CBU, Vancouver, British Columbia	6160		
1900-2000	CFCF, Montreal, Quebec	6005		
1900-2000	CFCN, Calgary, Alberta	6030		
1900-2000	CHNS, Halifax, Nova Scotia	6130		
1900-2000	CKWX, Vancouver, British Columbia	6080		
1900-2000	CFRB, Toronto, Ontario	6070		
1900-2000	(US) Far East Network, Tokyo	3910		
1900-2000	HCJB, Quito, Ecuador	11790	15270	17790
1900-2000	A,S KCBI, Dallas, Texas	11735		
1900-2000	KNLS, Anchorage, Alaska	11650		
1900-2000	KYOI, Saipan	9495		
1900-2000	Radio Algiers, Algeria	9509	9685	15215 17745
1900-2000	Radio Australia, Melbourne	6035	6060	6080 7205
		7215	9580	
1900-2000	Radio Ghana, Accra	6130		
1900-2000	Radio Havana, Cuba	11800		
1900-2000	Radio Kuwait, Kuwait	11665		
1900-2000	M-A Radio Malabo, Equatorial Guinea	9553	[ML]	
1900-2000	Radio Moscow, USSR	9580	9735	9875 11840
		11950	12030	12050 13605
		15135	15425	15475
1900-2000	Radio New Zealand, Wellington	11780	15150	
1900-2000	Radio Prague, Czechoslovakia	5930	7345	
1900-2000	Radio Riyadh, Saudi Arabia	9705	9720	
1900-2000	Radio RSA, South Africa	5950	7270	9610
1900-2000	Radio Zambia, Lusaka	9580		
1900-2000	Spanish Foreign Radio, Madrid	9765	11790	15395
1900-2000	M-A Superpower KUSW, Utah	15690		
1900-2000	A,S Swaziland Commercial Radio	6155		
1900-2000	Trans World Radio Swaziland	3205		
1900-2000	Voice of America, Washington	9760	11760	15410 15445
		15580	15600	17785 17800
		17870		
1900-2000	Voice of Ethiopia, Addis Ababa	9595		
1900-2000	Voice of Kenya, Nairobi	6100		
1900-2000	Voice of Nigeria, Lagos	7255	11770	
1900-2000	WCSN, Boston, Massachusetts	15390		
1900-2000	WHRI, Noblesville, Indiana	13760	17830	
1900-2000	WINB, Red Lion, Pennsylvania	15295		
1900-2000	S-F WMLK, Bethel, Pennsylvania	9465		
1900-2000	WRNO, New Orleans, Louisiana	15420		
1900-2000	WYFR, Oakland, California	11830	13695	15170 21615
1900-2000	M-A WYFR Satellite Net, California	13695		
1910-1920	Radio Botswana, Gaborone	3356	4820	
1920-1930	M-A Voice of Greece, Athens	7430	9395	9425
1930-1940	Radio Togo, Lome	5047		
1930-2000	ABC, Katherine, Australia	2485		
1930-2000	Radio Beijing, China	6955	7480	9440

1930-2000	Radio Bucharest, Romania	7145	9690	9750 11940
1930-2000	M-F Radio Canada Int'l, Montreal	9655	11945	15325 17875
1930-2000	Radio Korea, Seoul, South Korea	15575		
1930-2000	M-F Radio Portugal, Lisbon	9605	11740	
1930-2000	Voice of Republic of Iran	9022	9770	
1935-1955	RAI, Rome, Italy	7275	7290	9575
1940-2000	M-A Radio Ulan Bator, Mongolia	9575	11870	
1945-2000	All India Radio, New Delhi	9755	11860	
1950-2000	Vatican Radio, Vatican City	6190	7250	9645

2000 UTC [4:00 PM EDT/1:00 PM PDT]

2000-2005	S-F Port Moresby, Papua New Guinea	3295	4890	5960 5985
		6020	6040	6080 6140
		9520		
2000-2005	Radio Zambia, Lusaka	3345	6165	
2000-2010	M-A Vatican Radio, Vatican City	6190	7250	
2000-2010	A Radio Zambia, Lusaka	3345	6165	
2000-2010	Voice of Kenya, Nairobi	6100		
2000-2015	Radio Togo, Lome	3220	5047	
2000-2015	M-A Radio Ulan Bator, Mongolia	9575	11870	
2000-2015	Trans World Radio, Swaziland	3205		
2000-2025	Radio Beijing, China	6955	7480	9440
2000-2025	Radio Bucharest, Romania	5990	6105	7145 7195
		9690	9750	11940
2000-2030	KNLS, Anchorage, Alaska	7355		
2000-2030	Radio Australia, Melbourne	6035	7205	7215 9580
		9620		
2000-2030	Radio Budapest, Hungary	6110	7220	9585 9835
		11910	15160	
2000-2030	Radio Canada Int'l, Montreal	9555	6030	11945 15325
		17820	17875	
2000-2030	Radio Ghana, Nairobi	3366	4915	
2000-2030	Radio Korea, Seoul, South Korea	15575		
2000-2030	Radio Norway International, Oslo	9590	15310	
2000-2030	Radio Polonia, Warsaw, Poland	7125	7145	9525
2000-2030	Swaziland Commercial Radio	6155		
2000-2030	Voice of Nigeria, Lagos	7255		
2000-2030	Voice of Republic of Iran	9022	9770	
2000-2045	All India Radio, New Delhi	7412	9755	9910 11620
		11860		
2000-2045	WYFR, Oakland, California	11830	13695	15170 15220
		15375	15440	17750 21525
2000-2050	Radio Pyongyang, North Korea	6576	9345	9640 9977
2000-2056	Radio RSA, South Africa	7270	9610	
2000-2100	M-A ABC, Alice Springs, Australia	2310	[ML]	
2000-2100	ABC, Katherine, Australia	2485		
2000-2100	M-A ABC, Tennant Creek, Australia	2325	[ML]	
2000-2100	(US) Armed Forces Radio and TV	9700	15330	15430
2000-2100	BBC, London, England	5975	6005	6180 9410
		9515	12095	15070 15260
		15400	17760	
2000-2100	CBC Northern Quebec Service	9625	11720	
2000-2100	CBN, St. John's, Newfoundland	6160		
2000-2100	CBU, Vancouver, British Columbia	6160		
2000-2100	CFCF, Montreal, Quebec	6005		
2000-2100	CFCN, Calgary, Alberta	6030		
2000-2100	CHNS, Halifax, Nova Scotia	6130		
2000-2100	CKWX, Vancouver, British Columbia	6080		
2000-2100	CFRB, Toronto, Ontario	6070		
2000-2100	(US) Far East Network, Tokyo	3910		
2000-2100	Radio Kuwait, Kuwait	11665		
2000-2100	King of Hope, Southern Lebanon	6280		
2000-2100	KVOH, Rancho Simi, California	17775		
2000-2100	KYOI, Saipan	9495		
2000-2100	Radio Baghdad, Iraq	15230		
2000-2100	Radio Malabo, Equatorial Guinea	9553v		
2000-2100	Radio Moscow, USSR	11675	11840	11950 12050
		13605	15405	15425 15475
		15535	15560	
2000-2100	Radio New Zealand, Wellington	12050	15150	
2000-2100	Radio Riyadh, Saudi Arabia	9705	9720	
2000-2100	Radio Zambia, Lusaka	9580		

frequency SECTION

2000-2100	Superpower KUSW, Utah	15690			
2000-2100	Voice of America, Washington	9760	11760	15205	15410
		15445	15580	15600	17785
		17800	17870		
2000-2100	Voice of Turkey, Ankara	9825			
2000-2100	Voice of Nigeria, Lagos	11770			
2000-2100	WCSN, Boston, Massachusetts	15390			
2000-2100	WHRI, Noblesville, Indiana	13760	17830		
2000-2100	WRNO, New Orleans, Louisiana	15420			
2003-2100	WINB, Red Lion, Pennsylvania	15295			
2005-2100	Radio Damascus, Syria	12085	15095		
2010-2100 A,S	Voice of Kenya, Nairobi	6100			
2015-2100	ELWA, Monrovia, Liberia	11830			
2015-2100	Radio Cairo, Egypt	9670			
2025-2045	RAI, Rome, Italy	7235	9575	9710	
2030-2055	Radio Polonia, Warsaw, Poland	6095	7285		
2030-2100	Radio Australia, Melbourne	9580	9620		
2030-2100	Radio Beijing, China	6955	7480	9440	9745
		11790			
2030-2100 A,S	Radio Canada Int'l, Montreal	6030	9555	11945	15325
		17820	17875		
2030-2100	Radio Korea, Seoul, South Korea	13670			
2030-2100	Radio Netherland, Hilversum	9540	9895	11740	15560
2030-2100 M-F	Radio Portugal, Lisbon	7155	9740		
2030-2100	Radio Sofia Bulgaria	7115	7155	9700	11720
2030-2100	Radio Tirana, Albania	9480	11835		
2030-2100	Voice of Africa, Cairo, Egypt	15375			
2030-2100	Voice of Vietnam, Hanoi	9840	12020		
2040-2100	Radio Havana Cuba	15230	15300		
2045-2100	All India Radio, New Delhi	7412	9550	9910	11620
		11715			
2045-2100	IBRA Radio, Malta	6100			
2045-2100	Vatican Radio, Vatican City	9625	11700	11760	15120
2045-2100	WYFR, Oakland, California	11830	13695	15170	15566
		17612	17845		

2100 UTC [5:00 PM EDT/2:00 PM PDT]

2100-2105	Radio Damascus, Syria	12085	15095		
2100-2105	Radio Zambia, Lusaka	3345	6165		
2100-2110	Vatican Radio, Vatican City	6190	7250	9645	
2100-2110 A,S	Voice of Kenya, Nairobi	6100			
2100-2125	BRT Brussels, Belgium	5910	9925		
2100-2115	IBRA Radio, Malta	6100			
2100-2125	Radio Austria Int'l, Vienna	5945	6155	9585	9870
2100-2125	Radio Beijing, China	6955	7480	9440	9745
		11790			
2100-2125	Radio Bucharest, Romania	5990	6105	7145	7195
2100-2125	Radio Netherland, Hilversum	9540	9715	9895	15560
2100-2130	Radio Berlin Int'l, East Germany	6080	9730		
2100-2130 T,F	Radio Budapest, Hungary	6110	9585	9835	11910
		15160			
2100-2130	Radio Japan, Tokyo	5965	7140	7280	17835
2100-2130	Radio Korea, Seoul, South Korea	13670			
2100-2130	Radio Moscow, USSR	9665	9765	9865	11675
		11750	11950	11840	12050
		12060	13605	15425	15560
2100-2130	Radio Sweden, Stockholm	6065	11845		
2100-2130	Swiss Radio Int'l, Berne	9885	12035	15570	
2100-2135	ELWA, Monrovia, Liberia	11830			
2100-2140	Radio Havana Cuba	11725	15300	15340	
2100-2145	Radio Cairo, Egypt	9670			
2100-2150	Deutsche Welle, West Germany	9650	9765		
2100-2150	Radio Baghdad, Iraq	15230			
2100-2155	Radio Beijing, China	6860	9470	9860	
2100-2200 M-A	ABC, Alice Springs, Australia	2310	[ML]		
2100-2200	ABC, Katherine, Australia	2485			
2100-2200 M-A	ABC, Tennant Creek, Australia	2325	[ML]		
2100-2200	All India Radio, New Delhi	9550	9910	11620	11715
2100-2200	(US) Armed Forces Radio and TV	15330	15345	15430	
2100-2200	BBC, London, England	3995	5975	6005	6175
		6180	7325	9410	12095
		15070	15260	17760	

2100-2200	CBC Northern Quebec Service	9625	11720		
2100-2200	CBN, St. John's, Newfoundland	6160			
2100-2200	CBU, Vancouver, British Columbia	6160			
2100-2200	CFCF, Montreal, Quebec	6005			
2100-2200	CFCN, Calgary, Alberta	6030			
2100-2200	CHNS, Halifax, Nova Scotia	6130			
2100-2200	CKWX, Vancouver, British Columbia	6080			
2100-2200	CFRB, Toronto, Ontario	6070			
2100-2200	(US) Far East Network, Tokyo	3910			
2100-2200	King of Hope, Southern Lebanon	6280			
2100-2200	KSDA, Agat, Guam	9465			
2100-2200 M-A	KUSW, Salt Lake City, Utah	15690			
2100-2200	KVOH, Rancho Simi, California	17775			
2100-2200	Radio for Peace, Costa Rica	13660			
2100-2200 A,S	Radio Malabo, Equatorial Guinea	9552.5			
2100-2200 A,S	Radio Zambia, Lusaka	9580			
2100-2200	Voice of Africa, Cairo, Egypt	15375			
2100-2200	Voice of America, Washington	9760	11760	15205	15410
		15445	15580	15600	17785
		17800	17870		
2100-2200	Voice of Nigeria, Lagos	15120			
2100-2200	WCSN, Boston, Massachusetts	15390			
2100-2200	WHRI, Noblesville, Indiana	9770	17830		
2100-2200	WINB, Red Lion, Pennsylvania	15185			
2100-2200	WRNO, New Orleans, Louisiana	13760			
2100-2200	WYFR, Oakland, California	11830	15170	15220	15566
		17750	21525		
2100-2200	WYFR Satellite Net, California	13695	15375		
2110-2200	Radio Damascus, Syria	12085	15095		
2115-2200	BBC, London, England	5975	7325	9410	9915
		12095	15070	15260	
		6100	9620		
2115-2130	Radio Yugoslavia, Belgrade	9870			
2125-2155 S	Radio Austria Int'l, Vienna	5965	7160		
2130-2145	BBC, London, England*	6030	7230	9635	
2130-2200	BBC, London, England*	15270	17790		
2130-2200	HCJB, Quito, Ecuador	11605	12080	13625	
2130-2200	Kol Israel, Jerusalem	11880	11945	15150	15325
2130-2200	Radio Canada Int'l, Montreal	17820			
2130-2200	Radio Finland, Helsinki	6120	11945	11755	15400
2130-2200	Radio Sofia, Bulgaria	9700	11950		
2130-2200	Radio Tirana, Albania	9480			
2130-2200	Radio Vilnius, Lithuanian SSR	6100			
2130-2200	Swiss Radio Int'l, Berne	6190			
2135-2150 S-F	ELWA, Monrovia, Liberia	11830			
2150-2200 M-F	ELWA, Monrovia, Liberia	11830			

2200 UTC [5:00 PM EDT/3:00 PM PDT]

2200-2205 M-F	ELWA, Monrovia, Liberia	3993	11830		
2200-2205	Radio Damascus, Syria	12085	15095		
2200-2210 M-H	Port Moresby, Papua New Guinea	3925	4890	5960	5985
		6020	6040	6080	6140
		9520			
2200-2210	Radio Sierra Leone, Freetown	5980			
2200-2215 M-A	ABC, Alice Springs, Australia	2310	[ML]		
2200-2215 M-A	ABC, Tennant Creek, Australia	2325	[ML]		
2200-2215	BBC, London, England*	5965	7160		
2200-2215 M-F	Voice of America, Washington	9640	11740	15120	
2200-2225	RAI, Rome, Italy	5990	9710	11800	
2200-2225	Vatican Radio, Vatican City	6015	9615	11830	
2200-2230	ABC, Katherine, Australia	2485			
2200-2230	All India Radio, New Delhi	9550	9910	11620	11715
2200-2230	CBC Northern Quebec Service	9625	11720		
2200-2230 S	KGEI, San Francisco, California	15280			
2200-2230 M-A	KUSW, Salt Lake City, Utah	15580			
2200-2230 A,S	Radio Canada Int'l, Montreal	5960	9755		
2200-2230 S	Radio Norway Int'l, Oslo	15165	15180		
2200-2230	Radio Prague, Czechoslovakia	6055			
2200-2230	Radio Sofia, Bulgaria	9700	11950		
2200-2230	Radio Vilnius, Lithuanian SSR	9640	11790	13645	15180
2200-2245	Radio Berlin Int'l, E. Germany	5965	9730	11965	
2200-2245	WINB, Red Lion, Pennsylvania	15185			
2200-2245	WYFR, Oakland, California	9505	11830	13695	15375

frequency SECTION

2200-2250	Voice of Turkey, Ankara	21525			
2200-2255	RAE, Buenos Aires, Argentina	7135	7160	9445	17760
2200-2300	(US) Armed Forces Radio and TV	9690	11710		
2200-2300	BBC, London, England	6030	11790	15345	15430
		5975	6005	6175	6180
		7325	9410	9590	9915
		12095	15070	15260	
2200-2300	CBN, St. John's, Newfoundland	6160			
2200-2300	CBU, Vancouver, British Columbia	6160			
2200-2300	CFCF, Montreal, Quebec	6005			
2200-2300	CFCN, Calgary, Alberta	6030			
2200-2300	CHNS, Halifax, Nova Scotia	6130			
2200-2300	CKWX, Vancouver, British Columbia	6080			
2200-2300	CFRB, Toronto, Ontario	6070			
2200-2300	(US) Far East Network, Tokyo	3910			
2200-2300	King of Hope, Southern Lebanon	6280			
2200-2300	KVOH, Rancho Simi, California	17775			
2200-2300	Radio Australia, Melbourne	15160	15240	15320	15395
		17795			
2200-2300 M-F	Radio Canada Int'l, Montreal	5960	9755		
2200-2300	Radio For Peace, Costa Rica	13660			
2200-2300	Radio Havana Cuba	7140			
2200-2300	Radio Moscow, USSR	9665	9765	9865	11710
		11750	11780	11850	12060
		13605	15245	15425	15440
		15445	15495	15540	
2200-2300	Radio Moscow World Service	9490			
2200-2300	SBC Radio One, Singapore	5010	5052	11940	
2200-2300	Voice of America, Washington	15120	15185	15290	15305
		15320	17740	17820	
2200-2300	Voice of Free China, Taiwan	15440	17845		
2200-2300	WCSN, Boston, Massachusetts	15300			
2200-2300	WHRI, Noblesville, Indiana	9770	17830		
2200-2300	WRNO, New Orleans, Louisiana	13760			
2215-2230	BBC, London, England*	11820	15390		
2230-2300 A-S	CBC Northern Quebec Service	9625	11720		
2230-2300	Radio Beijing, China	3985	6165		
2230-2300	Radio Jamahiriya, Libya	11815	15450		
2230-2300	Radio Korea, Seoul, South Korea	15575			
2230-2300	Radio Mediterran, Malta	6110			
2230-2300	Radio Polonia, Warsaw, Poland	5995	6135	7125	7270
2230-2300	Radio Tirana, Albania	7215	9480		
2245-2300	All India Radio, New Delhi	6055	7215	9535	9910
		11715	11745		
2248-2300	WINB, Red Lion, Pennsylvania	15145			

2300 UTC [7:00 PM EDT/4:00 PM PDT]

2300-2315	BBC, London, England	5975	6005	6175	6195
		7325	9410	9515	9590
		9915	12095	15070	15435
2300-2330	Kol Israel, Jerusalem	9435	11605	12080	
2300-2330	Radio Canada Int'l, Montreal	9755	11730		
2300-2330	Radio Mediterran, Malta	6110			
2300-2330	Radio Polonia, Warsaw	5995	6135	7125	7270
2300-2330	Radio Sofia, Bulgaria	9700	11950		
2300-2330	Radio Sweden, Stockholm	9695	11705		
2300-2345	WINB, Red Lion, Pennsylvania	15145			
2300-0000	All India Radio, New Delhi	6055	7215	9535	9910
		11715	11745		
2300-0000	(US) Armed Forces Radio and TV	6030	11790	15345	
2300-0000	CBC Northern Quebec Service	6195	9625		
2300-0000	CBN, St. John's, Newfoundland	6160			
2300-0000	CBU, Vancouver, British Columbia	6160			
2300-0000	CFCF, Montreal, Quebec	6005			
2300-0000	CFCN, Calgary, Alberta	6030			
2300-0000	CHNS, Halifax, Nova Scotia	6130			
2300-0000	CKWX, Vancouver, British Columbia	6080			
2300-0000	CFRB, Toronto, Ontario	6070			
2300-0000	(US) Far East Network, Tokyo	3910			
2300-0000 M-A	KUSW, Salt Lake City, Utah	15580			
2300-0000	KVOH, Rancho Simi, California	17775			

2300-0000	Radio Australia, Melbourne	15160	15240	15320	15395
		17795			
2300-0000	Radio Baghdad, Iraq	6120			
2300-0000	Radio for Peace, Costa Rica	13660			
2300-0000	Radio Jamahiriya, Libya	11815	15450		
2300-0000	Radio Japan, Tokyo	11800	15195	17810	
2300-0000	Radio Moscow, USSR	9530	9765	9865	11710
		11750	11780	12060	13605
		13660	15245	15540	15425
		15560	17570	17685	17740
		17850	17860		
2300-0000	Radio Thailand, Bangkok	9655	11905		
2300-0000	WCSN, Boston, Massachusetts	15300			
2300-0000	WHRI, Noblesville, Indiana	9770	17830		
2300-0000	WRNO, New Orleans, Louisiana	13760			
2300-0000	WYFR, Oakland, California	5950	9505	13695	
2315-2330	BBC, London, England*	11820	15390		
2315-0000	BBC, London, England	5975	6005	6175	7325
		9515	9590	9915	12095
		15435			
2320-2325 M-A	Radio Prague, Czechoslovakia	6055	9630		
2330-2355 M-A	BRT, Brussels, Belgium	9925	11695		
2330-0000 M-A	Radio Budapest, Hungary	6110	9520	9585	9835
		11910	15160		
2330-0000	Radio Canada Int'l, Montreal	5960	9755	11730	
2330-0000	Radio Kiev, Ukrainian SSR	9640	9800	11790	13645
		15180	15455		
2330-0000	Radio Korea, Seoul	15575			
2330-0000	Radio Tirana, Albania	6200	7065	9760v	
2330-0000	Voice of America, Washington, DC	17735	17820		
2330-0000	Voice of Vietnam, Hanoi	9840	12020		
2335-2345 M-A	Voice of Greece, Athens	9395	9425	11645	
2345-0000	BBC, London, England*	3915	6080	7180	9580
2345-0000	Radio Berlin Int'l, E. Germany	6080	9730		
2348-0000	WINB, Red Lion, Pennsylvania	15145			

Another treasure from the collection of Marshall Watson of Ft. Walton Beach, FL.




POLYNESIE FRANÇAISE BP 125 PAPEETE

RADIO TAHITI



FREQUENCES

740 KHZ	20 Kw
6135 KHZ	4 Kw
9750 KHZ	4 Kw
11825 KHZ	20 Kw
15170 KHZ	20 Kw

Send us your special QSLs and we'll copy and return them promptly, to be used as space permits (QSL editor, PO Box 98, Brasstown, NC 28902).

SUBSCRIBE TODAY!

Don't Miss a Single Issue!

U.S. (*mailed second class**) :

- ☐ 1 Year for \$18 (12 issues) ☐ 2 Years for \$34 (24 issues) ☐ 3 Years for \$50 (36 issues) (SAVE \$4.00!)

Payment received by the 10th of the month will receive current issue. Back issues, when available, can be purchased for \$4.00 each (includes first class mailing).

* If you prefer first class mail add \$20.00 per year.

Canada, Mexico and Overseas (mailed in an envelope second class*):

- ☐ 1 Year \$26.00 ☐ 2 Years \$50.00 ☐ 3 Years \$72.00

* If you prefer air mail, please write for rates.

All foreign subscriptions must be paid by Visa, Mastercard, International, Bank or Postal Money Order in U.S. funds drawn on a U.S. bank.

NAME _____

ADDRESS

CITY

STATE

ZIP

Subscribe for a friend!

NAME _____

ADDRESS

CITY

STATE

ZIP

- ☐ Please send a gift card signed from _____

PAYMENT MUST ACCOMPANY ORDER!

Mastercard and Visa accepted

Month

Year

☐ MASTER CARD☐ VISA

				-					-					-					
--	--	--	--	---	--	--	--	--	---	--	--	--	--	---	--	--	--	--	--

Reprints of articles available for \$2 per reprint plus self addressed stamped envelope. Send name and month of article.

Make checks payable to:

MONITORING TIMES

140 Dog Branch Road

P.O. Box 98

Brasstown, NC 28902

1-704-837-9200



PANASONIC RF-B600

Panasonic's top-of-the-line world band receiver, the RF-B600, was introduced a while back, but is still quite up-to-date. What makes it particularly interesting just now is that production recently ceased in Japan, but Panasonic's warehouses still have quite a number in stock. This makes it a candidate for heavy discounting, so a window of

opportunity for striking a rare bargain may be open during the coming months.

A Portable That's Like A Tabletop Model

The 'B600 is something of a hybrid between a portable, which it is, and a tabletop receiver. It's designed to lay down flat, with

the controls facing you -- just like any tabletop receiver. But, unlike most tabletop models, the 'B600 runs off not only household current, but also batteries. It's a nice arrangement, because you can use it as a main receiver in the house, but also take it to the back yard or balcony, or even on automobile trips.

The only problem is that any set that qualifies as a tabletop model has to be fairly large and heavy, and the 'B600 is no exception. It's hard to imagine anyone trying to tote such a thing along as carry-on baggage, and if you put it in your suitcase you won't have much room left for anything else.

Variety of Tuning Features Includes Two Bandwidths

The RF-B600 has the usual range of tuning features: tuning knob, up/down slewing, keypad frequency entry, and programmable channel memories. The tuning is fully synthesized and the digital frequency readout is to the nearest tenth of a kilohertz -- something of a rarity among shortwave portables. It also has a real signal-strength meter, not just a scattering of LED's. This meter also serves as a battery strength indicator. There's a switchable dial light, too, and you can switch the frequency display off to save batteries.

There are two bandwidths -- another rarity in a portable -- and two tone controls to



GALAXY ELECTRONICS

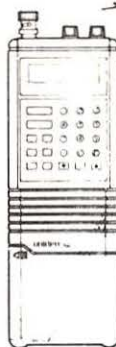
BOX-1202--67 EBER AVE.

AKRON, OHIO-44309

216-376-2402

FREE

**FREE CELLULAR MODIFICATIONS
WITH BC-200 & BC-760!!**



806-960 2nd Channel programmable hand held scanner 11 bands. Features: Weather search, 10 priority channels, Channel lockout, Scan delay, Automatic search, Illuminated LCD display, Snap-on Battery pack, Track tuning, Direct Ch. access, Leather case.

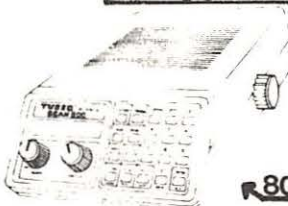
BC-200XLT \$279



806-952

100 Ch 12 band, aircraft & 800MHz, service scan, bank scanning, weather, priority, channel lockout, auto search, illuminated, programmable, track tuning, direct channel access, memory lock. DC with AC adaptor.

BC-760XLT \$288



806-950

TS-2 \$288

TS2

75 Channel mobile/home scanner, 12 bands with 800MHz, aircraft & weather, Turbo-Scan® (scans at 40 Channels per second), bank scanning, instant weather, fully programmable, accurate (50 channels per second), private priority, permanent backup system, direct access, external jacks for speaker & remote antenna, with AC adaptor, DC cord & mobile mounting bracket.

SHORTWAVE RADIO

KENWOOD	
R-2000 150khz-30mhz, Digital, Memorys	599.00
R-5000 100khz-30mhz, Digital, Memorys	799.00
SONY ICF-2010 150khz-30mhz, 76-108, 116-136	329.00
SONY ICF-2003 150khz-30mhz, Memorys	249.00
SONY PRO-80 150khz-216mhz, Memorys, Scans	359.00
SONY AN-1 Indoor Active Shortwave Antenna	79.00
ICOM R71-A 100khz-30mhz, Digital, Memorys	849.00
ICOM R-7000 25-2,000mhz, 100 Memorys	1,049.00
YAESU FRG-8800 150khz, 30mhz, Memorys, Scans	649.00
YAESU FRG-9600 60-905mhz, Digital, Memorys	539.00
NRD-525 0.9-34mhz, 200 Memorys, Digital	1,165.00
MFJ-1040 Tuner/Pre-Selector Unit	99.00
COBRA 2000GTL 40ch, AM/SSB CB Radio	399.00

POLICE/FIRE SCANNERS

BEARCAT	
BC-200XLT 200ch, 29-54, 118-174, 406-512, 806-960mhz	279.00
BC-100XLT 100ch, 29-54, 118-174, 406-512, Search, Delay	209.00
BC-760XLT 100ch, 29-54, 118-174, 406-512, 806-952mhz	288.00
BC-600XLT 100ch, 29-54, 118-174, 406-512, Priority, Search	214.00
BC-800XLT 40ch, 29-54, 118-174, 406-512, 806-912mhz	259.00
BC-55XLT 10ch, 29-54, 136-174, 406-512mhz	129.00
BC-15 10ch Crystal Scanner 30-50, 118-174, 406-512	114.00
REGENCY	
TS-2 75ch, 29-54, 118-174, 406-512, 806-950mhz	288.00
TS-1 35ch, 29-54, 118-174, 406-512, Priority, Delay	224.00
MX-3000 30ch, 30-50, 118-174, 406-512, Priority, Search	199.00
HX-1500 55ch, 29-54, 118-174, 406-512, Portable Unit	199.00
Z-60 50ch, 30-50, 88-108, 118-174, 406-512mhz	159.00

**USED
GEAR**

28 PAGE 1988 DETAILED PICTURE CATALOG \$1.00

AIR/POLICE/800 MHz

**BUY
SELL
TRADE**

FREE CELLULAR MODIFICATIONS WITH BC-200 & BC-760!!



Gear up for DX Season!

DX season is here! And Monitoring Times has what you need to bag those elusive signals -- We review the equipment, give tips on its use, tell you where and when to find those frequencies, which programs are tops, and even provide a forum for you to sell your old equipment as you upgrade! And MT advertisers are here to help you with that, too! Tell 'em you saw it all here!



shape the audio for most pleasant response. And it receives utility and ham single-sideband signals better than do most portables. In fact, it works better than any other Panasonic model we've tested to date at *Passport to World Band Radio*.

Reasonable Performance...

The set's performance, overall, isn't bad. It's reasonably sensitive and selective, which is fine. But the audio quality isn't quite up to Panasonic's usual high levels, simply because the speaker is rather small for a set of this size. Another problem is that the set's synthesizer is "laggy." It mutes between tuning increments, but takes a moment to come back to life. So, unless you tune very slowly, you get only snippets of sound. In fact, if you tune even at moderate speed, the set mutes and you don't hear a thing, so you have no idea what's on the stations you're passing by.

Another problem is that the set's dynamic range is not equal to what it should be for what amounts to a tabletop model. It overloads fairly easily with an outboard antenna, and in some parts of the world even with the built-in antenna.

...At A High List Price

Now, none of this, even when taken together, is all that serious. The problem is that this level of performance comes in a set that lists for \$749.95. You can do at least as well with the Magnavox D2999, which lists for slightly over half as much.

All of which brings me back to the point concerning the discontinuation of the Panasonic RF-B600. This set is well made -- better than the Magnavox offerings -- and comes with a two-year warranty. It is also unusually good at sorting out distant FM signals when the band is crowded. So, if the 'B600 is discounted to around 50-60% of its list price, it may well be worth considering, especially if you're looking for a tabletop model that's fully self-contained.

The Cobra SR-15 Handheld 100-Channel Programmable Scanner



One of the newer additions to the ever-growing number of "mega-channel" handheld scanners is the Cobra model SR15. Measuring a scant 2-3/4"W x 6"H, and weighing only 10- 1/4 ounces, this one truly meets the meaning of a "pocket scanner." Its small size, coupled with its 100 channel capability, make the SR 15 quite versatile.

For such a small package, there is no lack of frequency coverage whatsoever. The SR 15 has a range of 29-54 MHz VHF low-band; 108-136 VHF civilian aircraft band, 136-174 VHF high-band, and 406-512 UHF and "T" bands. Scanning speed is a respectable 15 channels per second, and a selectable delay feature allows a programmable 3 second delay to be added to any or all 100 channels. Also, any channel or channels can be locked out should you not want to hear it/them.

Priority Feature Included

In addition, a "priority" feature is provided. A user-determined frequency of major interest may be programmed into channel 1. When the feature is activated, the scanner will sample radio traffic on channel 1 every three seconds (while scanning other channels). Should any activity take place on channel 1, it takes priority. When the transmission is over, the SR15 then reverts back to its normal scanning function.

Another useful feature is the "search" capability. You can explore any given segment of any of the bands that the SR 15 covers. All you have to do is program the search limits into the scanner and touch the "search" button. Found frequencies may be entered directly into the scanner's memory or written down for future usage.

Search increments are nonadjustable and are factory-programmed into the SR15's internal memory. Also, in addition to automatic searching by this process, the user may also "step-search" manually between two frequency limits with two "up/down" buttons thoughtfully provided by the manufacturer (these buttons, labeled with "arrow" symbols, also double as the "limit" and "hold" buttons).

Separate buttons for "Scan" and "Manual" functions are provided, as well as a keylock button, to prevent accidental entries via the keypad or programming changes as a result of handling the scanner in operation.

Over 100 Channels

The SR 15 offers 100 user-programmable channels broken down into five selectable banks of 20 each. So, in addition to being able to lockout individual channels at will, the user also may lock out entire banks of channels as well. This allows a lot of versatility in that bank 1 can be filled with police channels, bank 2 with fire departments and so forth. The different banks can be turned on and off at will. So, not only can you quickly lock out entire groups of channels of low interest, but you may also lock out individual channels *within* these banks as well as the banks still being monitored.

Sidelit Frequency Display

All scanner functions including frequency display and bank indicators are displayed on the LCD on the scanner's face. It's sidelit with two tiny bulbs. A built-in timer automatically shuts the light off after about 20 seconds.

Separate thumbwheel-type controls for volume and squelch are located on the scanner's side, with a separate off/on switch, battery charge indicator LED, and antenna BNC connector on the top of the unit.

Provided with the SR15 are a narrow-duck antenna, wall-mount charger, NiCad battery pack, and a well-made leatherette carrycase and earphone. Jacks are provided on the scanner for the earphone and charger as well. The radio itself is housed in a handsome dark-grey metal-faced cabinet with a rugged plastic casing. All buttons are of soft rubber and are clearly labeled.

But How Does it Work?

In use, the SR15 is a "mixed blessing." Its small size and rugged construction make it very easy to carry around, and it fits in the palm of the hand so well one is hard pressed to believe it has so many features in such a small package. The internal NiCad batteries take nearly 14 hours to charge completely, but do yield about eight hours listening time per charge.

Though the audio from the unit is clear and crisp but tends to distort slightly at full volume (though not enough to create a real problem). The keypad buttons feel good, but are close together and could be hard for a "big" person to use easily.

Beep Beep

Though on the small side, the sidelit LCD readout is functional and quite readable in all lighting conditions. When programming data via the SR15's keypad, a "beep" is emitted each time a key is depressed. Though this allows the operator to know an entry has been made, it can also be slightly annoying when entering 100 channels worth of frequencies or each time any key is pressed thereafter.

The SR15 does have very good sensitivity, but the rubber duck antenna furnished with the scanner does not utilize the radio's full capacity. Using it seems to weaken reception. However, replacement with a whip-type extendible antenna or a duck-antenna designed for amateur radio use really wakes the unit up! An improvement here would be welcome.

Rugged Radio for Rugged Monitors

The radio itself is very rugged, and seems to survive well in harsh environments or with hard handling. Reception on VHF and UHF bands is very good, but lacks slightly on the VHF low band (this, however, was later found to be a result of the antenna problem previously noted, though performance on low VHF was slightly worse than the other bands). However, the civilian aircraft band reception (108-136 MHz) is slightly better than that usually found on other handhelds.

Image rejection is good to fair, though aircraft transmissions do come through on the VHF high band at times. As far as "birdies" (i.e. spurious signals) go, there are about as many as those usually found in most handheld scanners.

For the average scanner user, this radio does well.

WHY

DO SCANNER OPERATORS SPEND \$150 TO \$800 FOR THEIR EQUIPMENT AND FOR THE MOST PART ARE NOT HAPPY WITH THE RESULT?

THE WEAK LINK IS THE ANTENNA!

Now everyone can have antennas like the professionals but at a hobby price.

IF YOU WANT TO HEAR THE PROS, LISTEN LIKE A PRO.

Send \$.50 for full line antenna catalog to:

OHIO RADIO R&D
5421 Hickory Ct.
Lewisburg, OH
45338



Closing Comments

Unfortunately, the SR 15 does not cover the 800 MHz bands. If it did, with its size and features, it would be near ideal. As 800 MHz seems the "band of the future," it seems logical to include it in new monitoring equipment. In its stead, the SR 15 boasts a lot of channel capacity and a lot of coverage. It is well-made, has a lot of usable features, and is very "user-friendly." Operation is simple, with an illustrated booklet of directions in case you forget some manner of programming. At around \$239, it is worth the price.

Finally, for those familiar with the Bearcat 70XLT, the SR15 is nearly identical in appearance, though sports the 100 channel coverage of the recently-discontinued Bearcat 100XL. Gee whiz. I wonder who makes this scanner for Cobra? Those with the correct answer get two gold stars!



Build a Simple AM Radio

I have a number of experimenter friends who are skilled at circuit construction, but they aren't willing to build anything. They tell me that they would love to become involved with experimenting, but "I can't find the parts I need."

The fact of the matter is the parts are out there if you are willing to look for them. The day of the corner parts store has been gone for a long time so you *must* consider buying some of your components by mail today. I do not find this a hardship, since numerous electronics surplus dealers provide free catalogs. I buy all of my parts by mail, owing to a rural location that is 200 miles from the nearest full-blown supply house.

At the end of this article you will find a list of dealers from whom I buy components. I suggest you send for their catalogs. If Radio Shack doesn't have what you need, shop by mail! Don't overlook ham-radio flea markets as an excellent source of small parts. You will find hamfests listed elsewhere in *Monitoring Times*.

Discarded transistor radios and TV sets contain a wealth of small parts that can be reused. If you take advantage of this approach, your parts larder will grow rapidly.

Are Precise Values Vital?

You may worry about matching the specified component values when you read an article. Most circuits will work satisfactorily with resistor and capacitor values that are within 25% of the stated value. For example, if the circuit calls for a 430-ohm resistor, you may use a 470-ohm unit. Likewise with capacitors, such as substituting a 0.001uF disc capacitor for a 0.0015uF unit.

In a like manner, if a 100-pf variable capacitor is specified, you may use a 75 or 140-pf unit. The larger capacitor will provide greater tuning range than the 100-pf value, and the 75-pf variable will reduce the tuning range. Also, you may remove some of the rotor and stator plates from the 140-pf capacitor, thereby making it a 100-pf unit. Innovation goes hand in hand with experimenting!

Many transistor substitutions are similarly possible. You should obtain an up-to-date transistor substitution manual. Many circuits may, for example work perfectly when a 2N2222 or 2N4400 is substituted for a 2N3904 transistor, or vice versa. The

important items to consider are: (1) The maximum safe collector-to-emitter voltage rating. (2) The f_T (upper frequency specification). (3) Maximum continuous collector current. (4) The dc or ac beta (gain).

I would be lost without my *Motorola Small f-Signal Transistor Data* book (available from Motorola in Phoenix, AZ). I am able to compare the transistor electrical characteristics when I need to make a substitution. This enables me to use the transistors I may have on hand at a given time.

If the project you're duplicating calls for 1/4 watt carbon resistors, you may use 1/2-watt units. They occupy slightly more space in your circuit, but they will work fine. If resistor substitutions must be made, always use the next higher wattage rating.

When working with coils don't be hesitant to use, for example, no. 24 enamel wire in place of no. 22 enamel wire. The length of the coil winding will be shorter, but the performance will be approximately the same. In a similar vein, if the coil form is supposed to be 1 1/4 inch OD, don't hes-

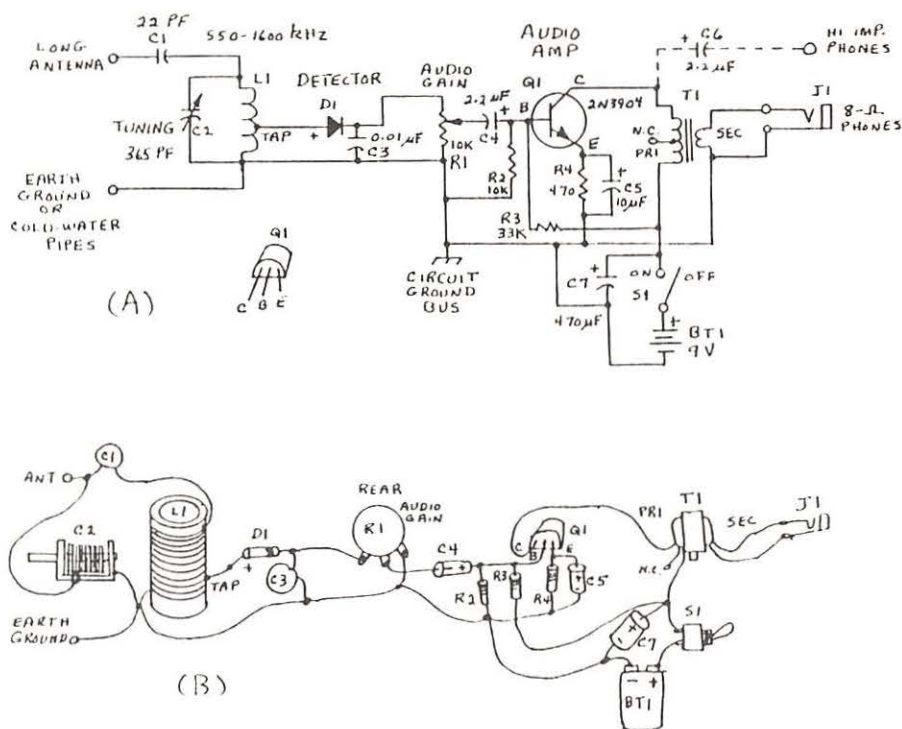


Fig. 1: Schematic diagram (A) of a simple diode-detector AM broadcast-band receiver. The resistors are 1/4 watt carbon composition types, except for R1, which is a potentiometer. The drawing at B shows the same circuit in pictorial form.

- BT1 -- Standard 9-volt transistor radio battery.
- C1, C3 -- Disc ceramic, 50 volts or greater.
- C2 -- 365 or 400- pf air variable.
- C4, C5, C6, C7 -- Electrolytic or tantalum capacitor, 16 volts or greater. Observe polarity when wiring circuit.
- D1 -- Small-signal germanium diode, 1N34A or equiv.
- J1 -- Two-circuit phone jack.
- L1 -- 220-uH coil. Close wind 220 turns of no. 28 enam. wire on a 5-inch length of 3/4-inch PVC pipe. Make coil tap 50 turns above the grounded end of L1. Avoid short-circuiting the coil turns at the tap point.
- Q1 -- Small audio transistor, such as 2N3904, 2N2222 or 2N4400.
- S1 -- Spst toggle or slide switch.
- T1 -- Audio output transformer (see text) from discarded transistor radio.

itate to use one that has a 1-inch OD. You may need to add a couple of extra coil turns in order to obtain the specified inductance, but it is not a major problem.

A Simple Project You can Build

Let's put something ordinary up on the workbench this month. It'll help familiarize you with circuit diagrams and how they relate to the hookup of the components. In order to simplify matters I am presenting schematic and pictorial diagrams of the project.

The circuit in Fig. 1 is for a crystal-detector AM radio which has a one-stage headphone amplifier. A 9-volt transistor-radio battery provides the power to operate the amplifier. The signal from the antenna is fed to coil L1. Tuning capacitor C2 is adjusted to resonate L1 at the desired signal frequency. This provides maximum output in the headphones. It also helps to reject unwanted AM broadcast signals that are higher and lower in frequency than the desired one. This is known as *selectivity* -- selecting only the desired signal frequency.

Detector diode D1 is tapped near the grounded end of L1. If it were connected to the top of the coil it would spoil the selectivity or sharpness of the tuning when C2 was adjusted to resonate L1. This is called *loading* of the tuned circuit. The diode is a low-impedance device, so it must be tapped at a low-impedance point on the tuned circuit, as shown.

Radio-frequency energy passes through D1 and is changed (rectified) to pulsating dc. These pulses are audible in headphones, and appear as voice energy or music. However, the rectified signal level may be too low to properly excite a pair of phones, so we have added the audio amplifier, Q1. It boosts the audio signal that comes from D1. The stage gain is on the order of 15 db.

Q1 operates as a Class A amplifier. Forward bias for Q1 is provided by resistive divider R2 and R3. A class A amplifier operates linearly, and this ensures low distortion. Output from Q1 is routed to transformer T1. It steps the Q1 collector impedance from a few thousand ohms down to 8 ohms for the headphones. This impedance transformation is necessary if we are to obtain maximum headphone volume. The greater the mismatch the worse the signal-power transfer: Maximum power transfer takes place when two unlike impedances are matched.

The transformer you use for IT1 is not critical. I suggest you remove the output transformer from a discarded transistor radio. It will probably have a center-tap

wire on the primary side. If so, ignore this lead as shown in Fig. 1. If you know where to buy a new miniature audio-output transformer, choose one that has a 1000- or 2000 ohm - primary impedance. The secondary should be designed to connect to an 8-ohm load.

C6 is shown with dashed lines in Fig. 1. You may add this component if you have high-impedance headphones. The T1 secondary winding is not used if this modification is made. Also, you may replace T1 with a 4700-ohm resistor if you use the C6 modification.

C7 is used from the +9-volt line to ground in order to overcome the internal resistance of the battery. C7 ensures that a proper ac ground is provided for Q1. Without C7 in the circuit it is possible for Q1 to self-oscillate and ruin the quality of the received signal.

A pictorial diagram of the circuit seen in fig. 1A is presented at B of Fig. 1. Study both diagrams to learn how the schematic diagram relates to the actual hookup of the circuit.

Construction and Use

You can build this simple radio on a piece of wood or perforated board. Keep the leads short, as mentioned last month. If you decide to build this project on a wooden base, you may use multilug terminal strips for component tie points. They may be attached to the wooden base with small wood screws.

Your antenna should be long, single wire. Make it as long as practical. The greater the wire length the stronger the

received signal. I suggest a length no shorter than 50 feet for urban dwellers. If you live some distance from AM broadcast stations, try to use 100 to 200 feet of wire. A proper earth ground is essential to good performance. Generally, the cold-water pipes in your home will provide an adequate earth ground for the receiver.

Connect an antenna and ground to the receiver. Attach the headphones and turn on the power. Adjust C2 until you hear a radio signal. Use R1 to provide comfortable headphone levels during reception. You will be amazed at how clean and clear the audio from this receiver is. It can be fun to plug the output of the receiver into your Hi-Fi system and hear the music at room level.

If you have two or more AM stations in your immediate area that are close together in frequency, you will find that they tend to interfere with one another. This is one of the tradeoffs when you use a crystal-detector radio: The input circuit of the radio is not selective enough to separate these loud stations.

Final Comments

I have attempted to walk you through the preliminary steps toward becoming an experimenter. I hope you have found this article interesting and helpful. Our *Monitoring Times* series will follow this approach in the months ahead. We will be discussing a variety of simple projects that you can build as you learn more about electronics. Meanwhile, have fun with the circuit in Fig. 1!



Mail-Order Component Suppliers

Surplus sales of Nebraska	1315 Jones St., Omaha, Nebraska, 68102 (402) 346-4750
DIGI-KEY Corp.,	701 Brooks Ave. South, P.O. Box 677, Thief River Falls, MN 56701
Small Parts Center	6818 Meese Drive, Lansing, MI 48911 (517) 882-6447.
Marlin P. Jones & Assoc.	P.O. Box 12685, Lake Park, FL 33403-0685 (407) 848-8236.
BCD Electro	P.O. Box 830119, Richardson, TX 75083-0119, 1-800-456-2233 (order line). Send \$1.00 for catalog.
Circuit Specialists	P.O. Box 3047, Scottsdale, AZ 85257.
John J. Meshna, Jr.	19 Allerton St., Lynn, MA 01904 (617) 595-2275/
Fair Radio sales	P.O. Box 1105, 1016 Eureka St., Lima, OH 45802.
R & D Electronics	1202H Pine Island Rd., Dade Coral, FL 33909 (813) 772-1441
Hosfelt Electronics	2700 Sunset Blvd., Steubenville, OH 43952, 1-800-524-6464.
All Electronics Corp	P.O. Box 567, Van Nuys, CA 91408. 1-800-826-5432.
Oak Hills Research catalog).	P.O. Box 250 Luther, MI 49656 (small parts and QRP transmitter kits. (SASE for
Amidon Assoc. Inc.	12033 Otsego St., N. Hollywood, CA 91607. IToroid cores, pot cores and ferrite rods.
Diamondback Electronics Co.	P.O. Box 12095, Sarasota, FL 34237. (813) 953-2829.
Jan Crystals	2400 Crystal Drive, Fort Myers, FL 33907.

experimenter's workshop

Simple and Effective

Antenna Ideas for the Sony 2010

by D.A. Michael, W3TS

I really like my Sony '2010 and I use it to listen to the ham bands most of the time. Because hams don't have megawatt transmitters like the shortwave broadcast stations, some of them are rather weak when using only the whip antenna on the Sony.

After thinking about using an outside antenna, I decided to try a few indoor wires first. I tried using the Sony wire antenna that is included with the radio but performance was not much better than with the whip. After looking at the schematic of the 2010 I saw why. Sony bypasses the RF Amplifier section when the external antenna is plugged in.

Now this is a good idea if you are plugging in a large antenna or a good long wire. But if you only use 10 or 20 feet of wire strung around the room, it is not any better than the whip with the RF amplifier operating.

A Better Ground

My first idea was to hook a better ground to the radio. This is a bit of a problem with the Sony as there is no ground connection of any kind. Checking the schematic again I saw the antenna jack was hooked to the radio ground. But if you use the required plug it will open the RF amplifier.

I tried to push a small plug in part way but it did not stay in very well. Then I ground down a banana plug on a grinding wheel to 1/8th inch diameter, and connected four feet of wire and a alligator clip to the banana plug. Push the banana plug in far enough to make connection to ground and hook the alligator clip to a good ground such as a cold water pipe. Now the Sony really plays.

More Success?

After this success I still wanted a bit better antenna than the whip. I knew that any antenna that I used would have to connect to the whip, otherwise the RF amplifier would be switched out.

I used a large croc clip and it worked fine but it mars up the whip. To avoid this I used a fuse clip, the kind of fuse clip that is made to mount onto a printed circuit board and accept a 3AG type fuse (see photo 3). This is a very good fit over the second section of the whip.

To this clip I attached 16 feet of wire. I chose 16 feet because it is a easy length to use indoors and it is a quarter wavelength on 20 meters. On the other end of the wire I attached a clamp-type clothes pin so the antenna can be clipped to a curtain or some other convenient point.

Yes! Success!

Now the Sony really plays on the ham bands. With the ground and 16 foot antenna hooked up, I receive many ham signals that are almost full scale on the LED S-meter. Sometimes it is necessary to turn on the attenuator to prevent overload!

Because the antenna and ground are small and the '2010 very compact, I can slip the whole works into my suitcase whenever I travel and keep up with the activity on the ham bands as well as all the interesting SWBC stations.

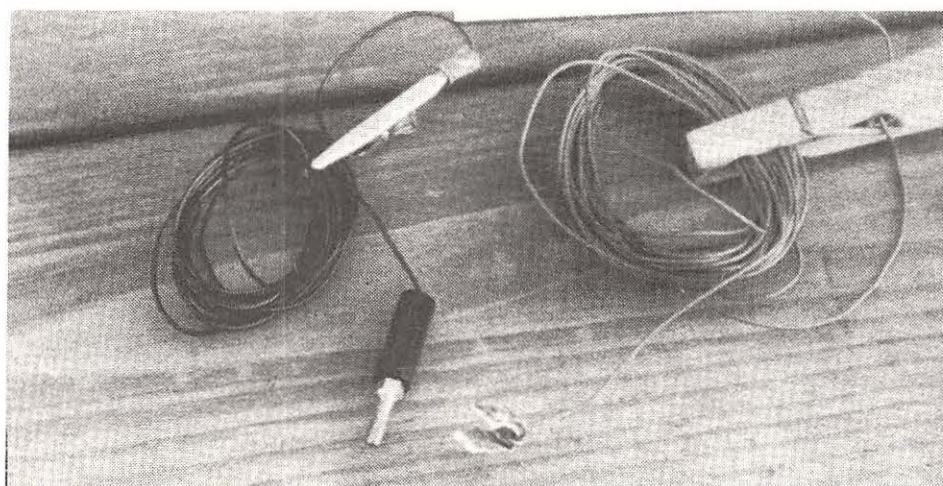


Fig.1: 2010 ground wire (left) and antenna wire (right)

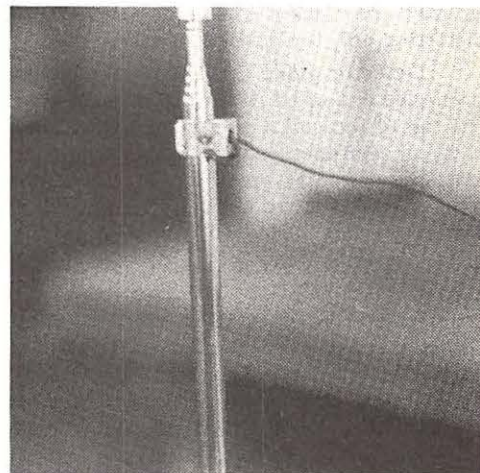


Fig.2: P.C. fuse clip used to hook onto 2010 antenna rod



Fig.3: Modified 2010 ground plugged in

Improving Selectivity on any 455 kHz Receiver

by Pete Haas

The following modification is electrically compatible with any HF shortwave receiver or scanner having a 455 kHz IF strip. It will greatly improve its selectivity. As an added bonus, it will simultaneously increase receiver sensitivity.

Because of physical variations in the receiver internals (the new filter and support circuitry will be larger than the filter being replaced) placement of the project is up to the ingenuity of the constructor. The filter and amplifier can usually be mounted in an open area inside the receiver cabinet and connected with shielded cable.

The 455 kHz filters are available from Fox-Tango Corp., Box 15944, West Palm Beach, FL 33406 (about \$60.00 each). Collins filters are available from Universal Shortwave, 1280 Aida Drive Reynoldsburg, Ohio 43068 (about \$150.00 each).

Collins filters display the following characteristics.

- 1.2 kHz. Ultra tight SSB filter.
- 1.9 kHz. Very tight SSB filter.
- 3.8 kHz. Super tight AM filter (also works on narrow band FM with a bit of distortion).
- 5.8 kHz. Very tight AM filter.

Construction

Figure 1 shows the schematic for the filter/amplifier combination. It can be constructed on a small piece of perfboard

and powered from the receiver's 9 - 12 volt supply. The photographs show typical stock IF filters. They're roughly 1/2 inch gray or black plastic cubes and usually have 455 stamped or imprinted on the top -- that's how you know you've located the IF filter. As you read the imprinting from left to right, the input lead is on the left, output on the right and ground in the middle.

It helps to have a schematic diagram handy to identify the receiver circuit board holes after pulling the stock filter. Cut a pair of shielded cables and attach the new filter to the appropriate holes. Hook up the power leads and away you go.

The crystal filter circuit board is light in weight and can be mounted with a dab of glue or double sided tape.

What to Expect

Depending on which filter(s) you chose, selectivity and adjacent channel rejection can be vastly improved. The Collins filters in particular are of very high quality with response graphs that look like torpedoes. The 3.8 kHz. filter is best for AM although music fidelity, while clear, will be limited in high frequency response.

For SSB reception, the 1.2 and 1.9 kHz filters are like the difference between night and day compared to most stock filters. And as a nice bonus, no matter which filter is chosen, the amplifier circuit actually boosts the IF signal more than the filter attenuates it -- which is about 6 to 10 dB.

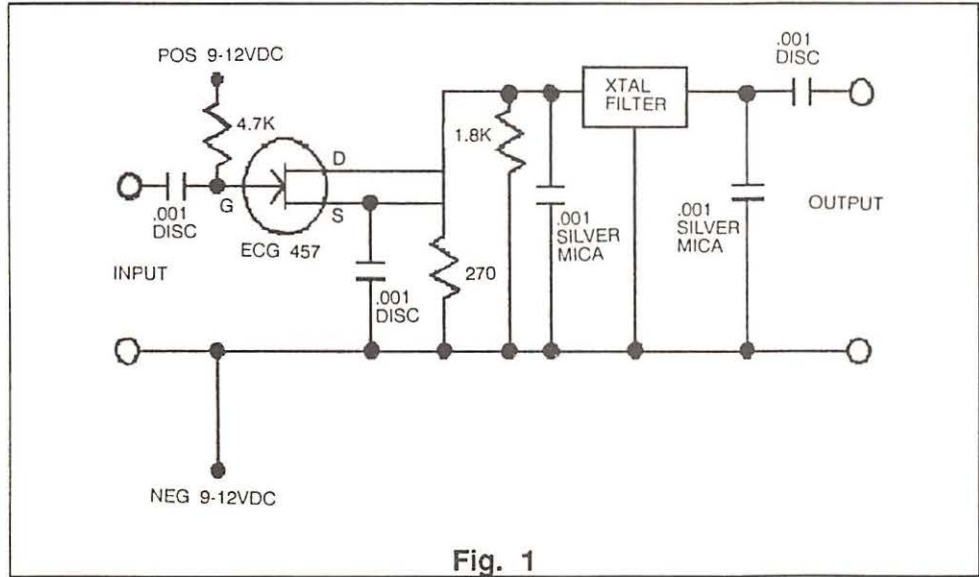
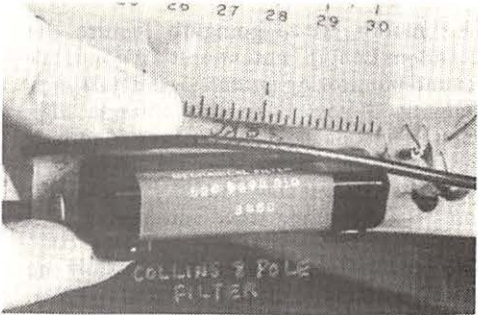
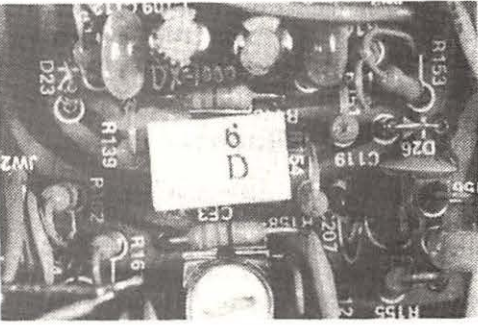


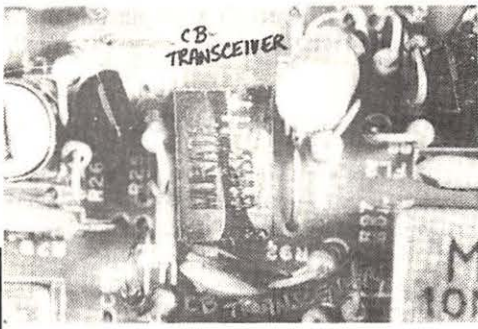
Fig. 1



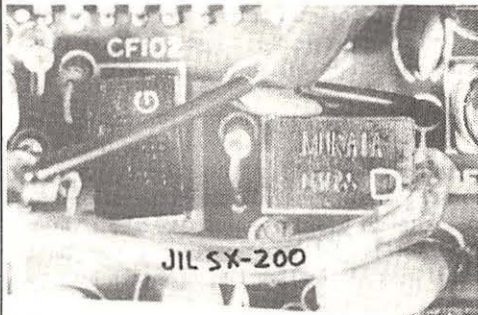
Collins 8 Pole Filter



Typical Stock IF Filter installed in a Bearcat DX-1000



Stock filter installed in a CB transceiver



Typical stock IF filters in a JIL SX-200

A Simple Random-Wire Antenna

This month, we're going to feature the "Random Length" antenna. It's a good, all-around monitoring antenna. And, just incidentally, if you make this antenna high enough and of a particular long length, it can function as a Marconi inverted-L antenna. Make it low and very long and it can be a Beverage wave-antenna!

The random-length antenna is possibly the easiest antenna of all to make and to erect. That's because, as you can see in figure 1, this antenna -- including its lead-in, is just one continuous piece of wire. It's suspended in the air by two insulators attached to poles, trees, buildings, or some other high point.

Excellent All-Rounder

When made very high and long, these antennas offer excellent performance for all-around monitoring. But even if you don't have too much space to use for the antenna, it's still likely to perform satisfactorily. Over the years, I've found random-length antennas to offer good signal output and relatively little problem with directional nodes. Wherever I go, I put one up, in addition to whatever else I may tie to the sky.

How Big Is Up To You

The length of wire you use for this antenna is limited only by your space and how much wire you have available. You may use just about any wire you have available. Soft copper will eventually break if the antenna is long. Hard-drawn copper is better, as is commercial antenna wire. Wire as small as number 20, or even 30 will work, but, like soft copper wire, is likely to break in time. Go instead for number 12, 14, or 16 wire. It's more appropriate. I have used copper, iron, and steel, all with good results.

Readers of this column may remember my writing on the use of a steel cable dog-run as a random-length antenna at my previous home. I sometimes talk on 75 meter phone to a ham in Maine, Amos, W1EBJ. Amos swears that that dog-wire put the best signal into Maine that I have shown him so far!

Higher and Longer is Better

The higher and longer you make this antenna, the better your reception should be. I usually use plastic or nylon rope or cord to support the insulators. Just make the antenna long enough to fill whatever length of space you have. The insulators can be purchased commercially, or made of plastic as shown.

Use an antenna tuner with this antenna if you wish, but in most cases it really won't improve the readability of the signals. Tuners tend to peak the noise along with the signal, and readability usually isn't helped by that.

So have fun. It's a simple project and one that works. Before we get into the cold weather, make time some weekend to hook up a random wire. You'll thank yourself during those cold, snowy nights by the radio.

RADIO RIDDLES

Last Month's Radio Riddle:

Last month I referred to the fact that there is at least one antenna design in which an antenna seems to be constructed out of nothing! What guess did you come up with? The space-vehicle plasma-antenna might have come to mind, as the streams of plasma which serve as the radiating

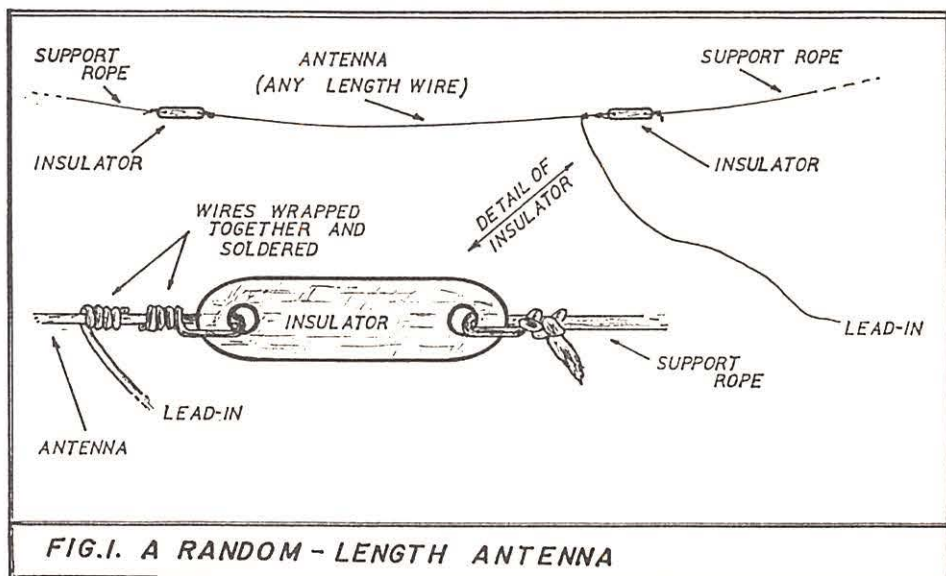
elements are a next-to-nothing gas. Some may have thought of the "image antenna," the mirror reflection-type action in the ground beneath the Marconi quarterwave antenna. Both of those guesses would seem to be fairly reasonable answers, but neither is what I had in mind when I asked the riddle.

The best answer that I can come up with is the "slot antenna." To make a slot antenna, a slot is cut in a conducting surface, such as a sheet of metal, and a feed-line is run to the slot in the conductor and attached to the edges of the metal slot. Taking out metal and leaving a hole makes an antenna! Slot antennas are much used on aircraft, where the slot is filled-in with an insulator, and the flat surface of the antenna then presents no wind resistance. Although this is an old design, I'm tempted to say "What won't they think of next?"

This Month's Radio Riddle:

Old timers and antenna buffs often categorize popular non-beam antenna designs into two groups. Each group is named for the man who devised the basic prototype of the antennas in that group. Marconi is one of these men. Who was the other, and what basic design got him that honor? You can find the answer right here, next month.

mt



**"I'D LIKE TO STOP
PUBLIC LAND ABUSE BY MYSELF.
BUT THE BOTTOM LINE
IS THAT I NEED YOUR HELP."**



Some individuals, either through ignorance or spite, are defacing our recreation areas, killing our wildlife, and destroying our history. It's more than a shame. It's a crime.

And we need your help to stop it.

Right now, in your area, there are good guys--businesses and corporations--who are dedicated to saving our public lands.

If you write to us, we'll tell you how your organization can join them

to help stop this senseless abuse. Let's keep public lands something the public can be proud of.



Write:
Take Pride in America
P.O. Box 1339-B
Jessup, MD 20794



BAD GUYS ABUSE PUBLIC LAND. GOOD GUYS SAVE IT.

Q. Is it all right to use the power adaptor that came with my Sangean ATS-803 in a country with "110-130 VAC, 50 Hz" power? (Brian Jones, San Antonio, TX)

A. Yes. The important specification is the voltage which should be within about 10% of the power specification. A 60 Hz power supply may run a little warmer at 50 Hz, but should not get hot. If it does, switch to battery operation or get an appropriate adaptor.

Q. My Grove TUN-3 MiniTuner works best on some frequencies and my Yaesu FRT-7700 better on others. Why? (Brian Jones, San Antonio, TX)

A. The MiniTuner is a passive preselector, not an impedance matcher. It allows only a narrow swath of spectrum to be received at any one setting to prevent overload and desensitization from intermod, images and dynamic compression.

The FRT-7700 is an impedance matcher ("antenna tuner" or "transmatch"); its purpose is to assure the most efficient transfer of all signals from the antenna cable to the receiver.

On those frequencies on which an antenna is naturally matched, a transmatch may offer little help, while a preselector will always sharpen the front-end selectivity of the receiver to resist strong-signal overload from

out-of-band powerhouses.

Q. What percentage of RTTY (radioteletype) signals can be monitored with conventional demodulators, and how many can be identified? (Brian Jones, San Antonio, TX)

A. Roughly 30-50% can be monitored, depending upon the capabilities of the equipment, and virtually all of them will eventually send an identifier. Several RTTY directories (Klingenfuss, Grove, others) which can help in identification are available from MT advertisers

Q. Is it possible to plan a shortwave antenna to receive a specific target area? I have been unsuccessful in hearing several stations from South Africa. (Alex Magqwala, Ottawa, Ont.)

A. Yes, but first ask yourself: Are the stations putting out enough power to be heard here? Are they beaming their programs in this direction? Are you listening to the right frequencies for the time of day (typically above 11 MHz during daylight hours, below 16 MHz for nighttime)?

Assuming that conditions for reception are favorable, then consider the following typical antenna plan for hearing Radio South Africa at 0200 UTC (10 p.m. EST) on 9580 kHz.

Using the formula: 468 divided by the frequency in MHz (9.58) equals the length in feet of a half-wave dipole, your ideal antenna would be 49 feet long, fed in the middle with any length of 50 ohm coaxial cable (RG-58/U or RG-8/U). The higher the frequency, the shorter the antenna.

Consulting a world globe, hold a piece of thread or string tightly against the globe, stretched between your location and your target area. This shows the signal path which should arrive broadside to your wire antenna (at right angles to the axis of the wire).

For example, if the shortest signal path is southeast, then the ends of the wire should point southwest and northeast so that the signal will arrive broadside to the wire.

On higher frequencies where the wire is now more than one wavelength, the pattern is a four-leaf clover; you may wish to consider this when you plan your ideal antenna installation.

Some listeners erect two wire antennas at right angles to each other, switching between the coax lines at the radio position by a common CB radio antenna switch or even a video game or TV/VCR "AB" switch. This allows trial listening for the best signal and may even allow rejection of some interference paths.

Q. Are there any frequencies which can be programmed into a scanner which can either detect or cancel out radar speed detecting equipment? (Stephen Wilson, Statesville, NC)

BC200XLT MEMORY LOSS, 800 MHZ SENSITIVITY, CELLULAR RECEPTION

The scanner industry's most popular handheld, the Uniden BC200XLT, was worth waiting for. Two occasional problems reported to MT have been checked out with the factory.

Even though an internal backup battery is supposed to retain memory for up to thirty minutes with the battery pack disconnected, some users note that when the batteries are low, all memorized frequencies may be lost, especially during the process of plugging in or unplugging the AC wall charger. Uniden suspects that a low voltage spike commands the microprocessor to erase all memories.

All production units now have a filter capacitor installed in the battery pack to eliminate the problem. BC200XLT owners who experience this low-charge

memory loss should return the unit (even if cellular-restored) to the factory for free warranty repair: Uniden Customer Service, 6345 Castlegate Drive, Indianapolis, IN 46250.

Rubber duckies are flexible and unobtrusive, but poor antennas. They are designed for high signal levels. At 800 MHz, signals are notoriously weak and inefficient antennas make matters worse.

If a good outdoor, indoor or mobile antenna is out of the question, replace the rubber ducky with an adjustable telescoping antenna like the Grove ANT-8 for substantial signal improvement.

While the restoration of cellular telephone frequencies in the BC200XLT is a relatively simple procedure, it may void the owner's warranty. Still, 800 MHz scan-

ners have notoriously poor image rejection, and cellular bases are easily heard by simply adding 21.7 MHz to the cellular frequency which has been deleted.

This works, however, only if the sum of the two frequencies does not result in a frequency still within the disabled 869-894 MHz band. For example, a signal appearing on 870.03 MHz could be received on the Bearcat image frequency of 891.73 MHz; unfortunately, this frequency is also within the deactivated range.

On the other hand, a frequency slightly higher, say, 872.43 MHz, would have an image on 894.13 MHz, back in the receivable range on the BC200XLT. With cellular restoration, however, the entire 806-950 MHz range may be received without gaps -- at the risk of a voided warranty.

A. No. Radar speed detectors use 10,525 MHz and above; no scanner is capable of operation above approximately 1300 MHz. Even the ICOM R7000 tunes to only 2000 MHz maximum.

Q. My general coverage short-wave receiver has an FM mode. Who uses FM between 100 kHz and 30 MHz? (Doug Chalmers, Palo Alto, CA)

A. Wireless intercoms (160-190 kHz), old style cordless telephones (1.6-1.8 MHz), petroleum exploration and broadcast remotes (25-26 MHz), illegal CBers (26-28 MHz), hams (29-29.7 MHz) and conservation agencies (29.7-30 MHz). Foreign FM skip will also be heard above 29.7 MHz.

Q. I know what MUF (maximum usable frequency) is, but how is LUF (lowest usable frequency) calculated? (Brian Jones, San Antonio, TX)

A. Just as our eyes are frequency sensitive to the visible light portion of the electromagnetic spectrum, the ionosphere (electrically charged portion of the upper atmosphere) is sensitive to the radio ranges of the electromagnetic spectrum.

Radio waves may be bent (refracted), reflected or absorbed, depending upon the degree of electrical activity in the ionosphere and the frequency of the signal. The sun is the greatest influence on signal path propagation.

At any given time, radio waves above a certain frequency may penetrate the ionosphere and be lost to space; below a certain frequency range they may be absorbed and won't return. These two frequencies are the MUF and LUF.

LUF is usually about 25% of MUF during daylight hours, dropping to below 2 MHz at night. Influences such as lightning static and interference are not considered in computing propagation parameters.

Q. Are there any pocket calculators which provide time readouts for various parts of the world? Seems this would make a good SWL item. (Harry Simpson, Jr., Kansas City, KS)

A. Not that we've been able to determine. There are small clocks which can be queried for key cities' times, but not a calculator with alphanumeric capability for typing in a city and getting a reading or one with prearranged keys.

Casio has a "World Time" wristwatch with 29 time zones which, when stepped through by a pushbutton, moves a cursor line sequentially through a map showing the world time zones, displaying the number of hours difference between each zone and your local time.

Q. I'm new to the hobby and have trouble understanding the difference between kilohertz and megahertz, especially when I see frequency listings in MT and then look at my radio. Can you help solve the mystery? (Robert Gobar, San Francisco, CA)

A. Sure; no question is too fundamental to ask. We all learn by asking questions and that's why this column is here.

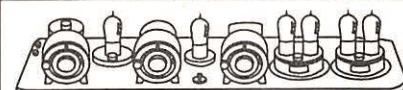
Radio waves have both electric and magnetic properties, oscillating (vibrating) back and forth at incredible speeds. The basic unit of vibration is called the hertz (formerly cycles per second).

Because these vibrations at radio frequencies are in the millions or even billions per second, we use prefixes as multipliers, "kilo" meaning 1000 times and "mega" meaning 1,000,000 times.

For example, the radio waves which reach your AM car radio vibrate about 1,000,000 times per second (or 1 megahertz, abbreviated 1 MHz; or 1000 kilohertz, abbreviated 1000 kHz); those which are received by your TV or scanner are hundreds of megahertz in frequency.

By convention, frequencies below 30 MHz are usually, but not always, expressed in kilohertz; thus, your shortwave dial may read 11760 (kHz) or 11.760 (MHz). Note that there will always be three decimal places difference between kHz and MHz.

Another example: our local police frequency is 154.875 MHz; this could also be expressed as 154,875 kHz, a rather large number. Even larger would be an expression of this frequency in the original basic unit: 154,875,000 hertz (Hz).



**IF YOU BUY, SELL OR COLLECT
OLD RADIOS, YOU NEED...**

ANTIQUE RADIO CLASSIFIED

**Antique Radio's Largest-Circulation
Monthly Magazine**

Articles - Classifieds - Ads for Parts & Services

Also: Early TV, Ham Equip., Books,
Telegraph, 40's & 50's Radios & more...

Free 20-word ad each month. Don't miss out!

Free Sample. 6-Month Trial - \$11.

1-Year: \$19 (\$28 by 1st Class). Foreign - Write.

A.R.C., P.O. Box 2-P4, Carlisle, MA 01741

Q. How has the dynamic range of an inexpensive receiver like the Sangean ATS-803A been so improved that a wire antenna can be clipped to it without using a preselector or tuner? (Brian Jones, San Antonio, TX)

A. It hasn't. Use a preselector if the wire is more than about ten feet long.

Q. I was told that MT had a note about a publication which specializes in Morse code, its history and stories. How can I get it?

A. For a subscription to Morsum Magnificat, send an international check or postal money order in the amount of 7 pounds sterling to Tony Smith, G4FAI, 1 Tash Place, London, England N11 1PA.

Sharp AM selectivity on a receiver does not necessarily mean muffled audio. Doug Ferrell of Tallahassee, Florida, wrote to remind us that if the tuning dial is slightly moved up or down from center frequency, audio crispness may be enhanced once again even though the selectivity switch is in the narrow position.

Questions or suggestions sent to MT are printed in this column as space permits. If you prefer an answer by return mail, you must include a self-addressed, stamped envelope.

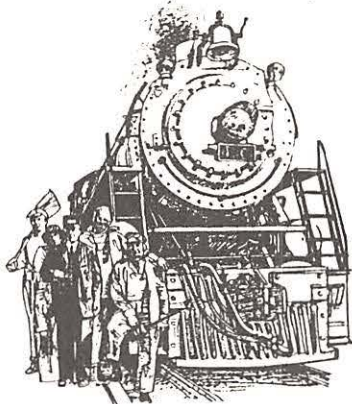
LETTERS

continued from page 3

Defective Puzzle

If you are going to publish puzzles, please make sure that they are not defective. A case in point is the "Ham Convention Hotel" by Joe Strolin on page 41 of the July issue. The first paragraph says that "ten" sought shelter, the fifth paragraph says "two" men placed in room 'A'. The seventh paragraph says that the "tenth and last" was taken from room 'A'. This is impossible as the tenth and last person was left in the lobby waiting to check in. The person taken from room 'A' was number one or two.

Richard Ferch
Bricktown, New Jersey



"Engineer" Bob Grove

Out of all the frequencies you published for railroads in your July issue, which ones are correct for my area? That's a lot of frequencies for me to have to guess.

Guy DeMarco
Philadelphia, Pennsylvania

The process is simple. Railroad radio in the U.S. and Canada is located between 106 and 162 MHz. Simply set your scanner to search and wait for some action. We forgot to mention one other railroad frequency guide: Tom Kneitel's "Rail Scan." It's indexed by railroad name. I don't know the price of the book or even if it's still in print, so you might want to contact the publisher, CRB Research, at Box 56, Commack, NY 11725. --Ed.

I have been an avid model train enthusiast for the past 30 of my 75 years. Naturally, I receive all the various train magazines, but I can't ever remember seeing *Monitoring Trains* at my local news stand. Are you a new publication?

Your July issue was noteworthy. The cover page of the old 1218 certainly brought back some fond memories of the steam era for me. And Mr. Grove's misty-eyed article about the engine that said, "I think I can" simply delighted my wife -- she claims that sexually, the expression fits me to a "T".

Well, keep up the good work and I can't wait to see what trains Mr. Grove will monitor next month!

C.C. Charlie
Philadelphia, Pennsylvania

The Elusive WCSN

I've heard a lot about WCSN, the World Service of the *Christian Science Monitor* but I have been unable to hear it. Can you tip me off?

Sure. The new schedule, official as of press time and scheduled to take effect on September 25, is as follows:

0000-0200	9850 to West Africa
0200-0400	9870 to E. Africa
0400-0600	9870 to W. Africa
0600-0800	7365 to Europe
0800-1200	Off
1200-1400	5980 to E. Canada
1400-1600	13760 to E. Canada/ Europe
1600-1800	21640 to S. Africa
1800-2000	21640 to E. Africa
2000-2200	9495 to Europe
2200-2400	9495 to W. Africa

That courtesy of Ann Case of George Jacobs and Associates, the station's frequency consultant. -- Ed.

Domestic Broadcasting

I'm a broadcast band DXer of some 15 years and need some help. Where can I get more information on what's going on in the world of AM

radio in this country.

Ed Caney,
Cedar City, Utah

Right here in *Monitoring Times*. Current Domestic Broadcasting columnist Paul Swearingen, who said in a recent issue of the hobby club bulletin "DX News" that he hadn't been DXing seriously or consistently "since 1982" is retiring. And we're taking the opportunity to revamp the column and make it more useful to active AM, FM and TV listeners. Watch for it! --Ed.

Shuttle Mania

I enjoyed Ken Reitz's article on DXing NASA and the Space Shuttle. But I seem to remember that you once published frequencies for radio monitors as well. Is there a chance I can get a reprint of that article?

We'll do you one better. Although we don't know exactly when the shuttle will be launched, you'll find a complete and fully updated list of frequencies in this issue. Be sure to check out the shortwave frequencies that relay shuttle audio and have a chuckle to yourself. People without shortwave radios will have to pay to call one of those "976" numbers to hear the same thing we're giving you for free! -- Ed.

Letters should be addressed to **Letters to the Editor**, *Monitoring Times*, P.O. Box 98, Brasstown, NC 28902 and should include the sender's address and telephone number. Not all letters can be used. Those that are will often be edited and excerpted. Because of the volume of mail received, personal replies are not always possible.

Credit Due

We haven't given credit where it's due -- The photos used in July's "Summer Listening, Summer Not," and in "Confessions of a Scanner Collector" in the August issue were all taken for MT by Harry Baughn.

**To subscribe to MT
please see page 87.**

"We Have Liftoff"

TABLE 5

cont'd from page 9

138.300 AF	Command post channel 19 (paired with 383.0)
138.350 AF	
138.400 AF	Air-to-air alert 1
139.650 AF	
139.700 AF	ARRS Air-to-air
141.300 AF	NASA Variety net
141.600 AF	OV-10 air-to-air data
141.700 AF	OV-10 aircraft
142.155 AF	MARS Repeater out
142.300 AF	A-7 aircraft
143.450 AF	MARS Repeater in
148.065 AF	Command net repeater in
149.095 AF	Runway operations
148.185 AF	Radio shop
148.225 AF	Nell maintenance
148.265 AF	Base supply
148.275 AF	Page-base net only
149.265 AF	
149.535 AF	Command net repeater out-phone-page
	SAC operations
150.225 AF	
163.4875 AF	
163.5125 AF	NASA ETR
165.1375 AF	Transportation
165.1625 AF	Fuels
173.0250 AF	Security-tactical 1
173.1250 AF	Command post-tower
173.1750 AF	Security-tactical 2
173.4125 AF	Civil engineering net
173.4375 AF	Hospital-CD net
173.5875 AF	Fire-tactical 1
228.8000 AF	NORAD
228.9000 AF	AR655 secondary refueling channel
234.7000 AF	NORAD
238.5000 AF	NORAD
251.0000 AF	NORAD
251.9000 AF	ARRS PAFB jolly ops channel
252.8000 AF	ARRS/training/TAC
256.6000 AF	NORAD
260.2000 AF	AR655 primary refueling channel
	NORAD
263.2000 AF	
263.8000 USCG	
264.8000 AF-NASA	Thinker A/C net
267.5000 NAVY	Sealord PAFB site (paired with 120.950)
	NORAD
270.4000 AF	
273.5000 AF	PAFB ATIS 1200-0400Z
275.0000 AF	NORAD
278.6000 AF	NORAD
282.0000 USCG	
282.8000 USCG	SAR operations eastern test range
	NORAD
287.8000 AF	
289.4000 AF	PAFB Clearance delivery (departing A/C only)
290.8000 AF	Approach/departure PAFB ATC channel 13
	NORAD
292.7000 AF	
294.6000 AF	Variety network channel
297.2000 AF	PAFB radar channel 14 (GCA discrete)
	NORAD
298.5000 AF	
302.4000 AF	NORAD
306.4000 AF	NORAD
311.0000 AF	SAC Primary channel
312.0000 AF	SAC U-2 operations
322.8000 AF	AR655 primary refueling
324.7000 NASA	T-38 A/C
325.5000 AF	NORAD
335.8000 AF	PAFB ground control channel 01 (paired with 121.700)

338.4000 AF	NORAD
340.8000 AF	Air-to-air OV-10 A/C
340.9000 AF	Approach/departure PAFB ATC channel 03 (paired with 125.1)
	Nell operations
343.0000 AF	NORAD
344.0000 AF	
344.6000 AF	PAFB Metro: weather info
348.8000 AF	PAFB tower channel 02 (paired with 126.2)
	Air-to-air A-7 A/C
351.0000 AF	
351.2000 AF	
356.0000 AF	NORAD
358.3000 AF	Approach/departure PAFB ATC channel 12 (paired with 119.250)
	Air-to-ground OV-10 ch 11
363.9000 AF	NORAD
364.2000 AF	
366.3000 AF	AR655 secondary refueling
369.2000 AF	PAFB radar channel 15 (GCA discrete)
	Sealord secondary channel (paired with 135.825)
369.9000 NAVY	PAFB dispatcher/base operations (paired with 128.8)
372.2000 AF	
	PAFB radar channel 16 DEC
372.8000 AF	FEQ ETR (GCA discrete)
	NORAD
375.1000 AF	PAFB radar area 7 TAC (GCA discrete)
378.8000 AF	
	Air-to-ground
381.8000 USCG	PAFB command post channel 19 (paired with 138.3)
383.0000 AF	Raven operations
383.2000 AF	
383.3000 AF	
385.7000 AF	
386.2000 AF	NORAD
392.8000 AF	NORAD
395.1000 AF	
396.9000 AF	SAC
407.8500 USSS-NSA	Echo PAFB site TX
413.1000 AF	Marine operation
413.2750 AF	AFSC Security
413.4000 AF	MAC
415.7000 USSS-NSA	Foxtrot PAFB site RX
420.0000 AF	PAVE PAWS: Surveillance radar

TABLE 6
KENNEDY SPACE CENTER

Primary launch channels	
101 171.0000	Utilities
102 165.1875	Telemetry/meas
103 173.6875	Security pri ch1
104 162.6125	Launch support
105 173.6625	Pri pad ops
106 170.4000	GSA supply
107 170.1500	Base comm/press sup
108 163.5375	Pad/paging
110 165.4125	Orbiter ops
111 173.5375	Loan pool
112 148.4550	SRB recovery ops
113 149.1750	SRB recovery ops
116 173.5625	KSC fire pri ch1
117 173.4375	Hospital-CD net
Secondary launch channels	
201 171.1500	General main/fuels
202 165.6125	Telemetry/MSBLS
203 173.1750	Security tac ch2
205 in use, freq unknown	
206 170.1750	GSA truck/rail sup.
208 155.7150	Link to Brevard Edc
216 173.7875	KSC fire tac ch2

Tertiary launch channels

303 155.3700	Florida Intercity
306 162.0125	GSA marine ops
308 170.3500	Base paging
316 154.160	link to Brev. city fire

Backup tertiary launch channels

408 171.2625	Pad TV-coord direct
--------------	---------------------

MAGAZINE COLLECTORS' DELIGHT

A loyal MT reader and listening hobbyist, Richard Hackney of Nashville, Tennessee, has magnanimously donated hundreds of magazines and books to be shared with fellow radio enthusiasts. They are available from MT at no charge except for shipping and handling. First come, first serve at only \$15 per box.

- BOX 1: 93 issues *Electronics Illustrated*, *Popular Electronics* '64-'72
 BOX 2: 75 issues *Popular Electronics*, *Elementary Electronics* '72-'81
 BOX 3: 82 issues *Popular Electronics* '74-'77, *Popular Electronics* '78-'82
 BOX 4: 93 issues *Radio Electronics* '76-'81, *Computers and Electronics* '82-'85
 BOX 5: 15 various books on electronics, shortwave, testing
 BOX 6: 180 issues *SPEEDX* '78-'87 comp. **SOLD** *Communications* '83-'87 complete
 BOX 7: 66 issues *Radio Electronics* '84-'87, *Communications Handbook* '69-'78, *Communications World* '73-'79, several SWL books

We appreciate Richard's thoughtful gesture and know that there will be some happy MT readers benefiting from this windfall of literature.

SELL MT IN YOUR STORE!

MONITORING TIMES
DEALERSHIPS
ARE AVAILABLE
AT A
SUBSTANTIAL DISCOUNT.

CALL OR WRITE

JUDY GROVE
P.O. BOX 98
BRASSTOWN, NC 28902
PHONE 704-837-9200

STOCK EXCHANGE

NOTE: Monitoring Times assumes no responsibility for misrepresented merchandise.

NON-COMMERCIAL SUBSCRIBER RATES: \$.10 per word; **NON-SUBSCRIBER RATE:** \$.25 per word. All ads must be paid in advance to *Monitoring Times*. All merchandise must be personal and radio-related. Ads for Stock Exchange must be received 45 days prior to the publication date.

COMMERCIAL RATES: \$30 per 1-3/4" must accompany ad, payable to *Monitoring Times*. Send 1-3/4" square camera-ready copy, or any square copy for photo-reduction, or send text for typesetting.

For Sale: INFO-TECH M6000, like new condition, used VERY little. With cable, manual, ref. books, etc. I pay shipping: \$635. Vernon [601] 896-6639.

For Sale: ICOM R7000 in mint condition with original box, manual and packing. Also includes remote control, 12VDC power kit, and F to N adapter, \$935. Also, REGENCY MX-5000 which has had Grove scan speed enhancement, \$235, and BEARCAT 300 with original box, \$185. Will consider trade for programmable handheld for the BC-300. Call Harry McCabe at [703] 680-6345 after 6 pm, or send CASHIER'S CHECK OR MONEY ORDER ONLY to 4688 Joanna Court, Woodbridge, VA 22193.

Wanted: SONY CRF-320A and ZENITH transistor "Oceanic" radio 11 or 12 band, complete or parts. Wade, 657 14th Ave, Prospect Park, PA 19076.

SWLTEXT cartridge for C64 \$35; MFJ 1200 CW computer interface \$22; RADIO SHACK PRO47 scanner \$35; LAFAYETTE solid state VHF high & low FM receiver \$35; two DRAKE 850 LNB's \$25 each. WANTED: 1" & 2" scope tubes, AUTECH QF1A audio filter, FL44A SSB filter SP3, SP230, SP820 or SP180 speakers. David, Box 6463, Mobile, AL 36660 [205] 478-8823.

Sale: RADIO SHACK PRO47 scanner \$35; VHF high & low band FM receiver \$35. WANTED: HEATHKIT HG10B VFO; MFJ CWF2 filter, QF1A filter, SP3, SP120, SP70,

SP180 or SP230 speakers; MBATEX & airdisk cartridges for C64 1EP1 and 1CP1 scope tubes, any C64 software. David, Box 6463, Mobile, AL 36660. [205] 478-8823.

JIL SX-200 scanner. 16 channel programmable with aircraft. Variable search/scan rate - \$125. DX-400 receiver, 150 kHz through 30 MHz portable with AM/SSB/CW and FM broadcast, memories and search mode - \$125. Both in like-new condition with all original materials. I'll pay UPS. Brent [404] 565-8112.

TAP NEWSLETTER: complete set. Over 300 pages of telephone phreaking, hacking, surveillance, bugging and locksmith. Protect yourself! \$60 money order. John Leonardelli, Box 722, Station A, Downsview, Ontario, M3M-3A9.

For Sale: Top condition JAPAN RADIO COMPANY receiver type NRD-515 with speaker NVA-515 and memory NDH-518. All \$500.00 + UPS. Jose A. Fernandez, P.O. Box 2362, Hato Rey, P.R. 00919.

Wanted: BEARCAT 250 scanner, excellent condition. [518] 274-8495 after 5pm. 150 Oakwood Ave., Troy, NY 12180.

REGENCY HX2000 hand-held portable 118-136, 144-174, 440-512, 800-950 MHz. With Nicads, charger, 2 antennas, carrying case, instruction manual. Absolutely complete and in perfect condition. Will ship prepaid UPS. \$125. Mark Nelson, 1105 Kelden Ridge, Marietta, GA 30068. [404] 594-9340.

Want info on Camp George West in Golden, Colorado. Have many Colorado frequencies to exchange. Call Jerry [303] 433-1003.

Interested in clandestine, religious and pirate address lists or in pirate radio tapes and CBM-64 DX-software? Send 2 IRC's for a detailed list to Ary Boender, Lobeliastraat 33-B, 3202HR Spykenisse, The Netherlands.

Wanted: DRAKE R4-E receiver in very good condition with broadcast crystals. Jefferson Rice, Bon Air Apts #315, 2101 Walton Way, Augusta, GA 30904.

For Sale: HX1000, good condition, \$95.00. All accessories included. Call David, [407] 847-9994, weekdays, between 9 and 5.

WASHINGTON, OREGON & BRITISH COLUMBIA SWLS/DXERS: UNITE! Join

DX/Northwest, a regional club seeking your participation. Meet other shortwave enthusiasts through meetings, DXpeditions, and the monthly Grayline Report newsletter. For information and sample issue, send SASE (or IRC): DX/Northwest, 205 SW Clark #C-4, Issaquah, WA 98027-3772.

PANASONIC RF-3100, like new, 500 kHz-30 MHz, manual, paid \$400, sell \$225. Will ship COD. John Gardner, 10990 Del Norte St. #11, Ventura, CA 93004 [805] 659-4129.

AIRCRAFT DIRECTORY HF/VHF/UHF

Thunderbirds / Blue Angels
Control Tower / ARTC Center
Refueling - TAC/SAC/MAC
ARINC VHF & World Wide HF
Monitor Techniques & More
Civil & Military Channels

\$14.94 includes postage

D-C Enterprises
7887 Brandy Circle
Colorado Sprgs, CO 80920

Ham/SWL Holiday in VP5!

Join Cycle 22 fun from rare DX QTH in Turks & Caicos Islands. Superb band conditions with longer openings, stronger signals, near tropic propagation. For hams we offer transceiver antenna, process VP5 license with accommodations as low as \$390 each double occupancy in private hilltop bungalow. Direct Pan Am service, 80 minutes Miami. Details:

VP5D, P.O. Box 100858
Ft. Lauderdale, FL 33310

PS: Techs have FULL HF privileges here!

COMMUNICATIONS INSURANCE

INTRODUCING THE ECHO-3
TELEPHONE LOGGING RECORDER

- Records up to three telephone lines or three telephone positions simultaneously!
- Digital "Time-on-tape"
- Records up to eight hours of conversation on a C-120 standard cassette
- VOX ... for two-way radio logging ...
- Many other options including endless loop ...

HAYNES COMMUNICATIONS CORP.

15 GAZZA BLVD.
FARMINGDALE, N.Y. 11735

(516) 420-9454 • (516) 752-9734

YOU AIN'T HEARD NOTHING...YET!

Largest selection of scanner frequency guides (federal, military, police, aero, etc.); AM/FM/TV broadcast directories; HF "ute" directories; Books on espionage, covert ops., bugging, wiretapping, surveillance, clandestine radio, & more!
BIG FREE CATALOG!

CRB RESEARCH
P.O. Box 56-MT
Commack NY 11725

INDEX OF ADVERTISERS

AF Systems	53
AnTenna Farm	43
Antique Radio	99
Communications Electronics	17
CQ Communications	51
EEB	21
Galaxy Electronics	89
Grove Enterprises	55, Inside Back
Ham Radio	67
ICOM	Inside Front, Back Cover
Lunar Industries	54
Monitoring Times	87
Ohio Radio	91
Scanner Master	37
Scanner World	35
Systems & Software	39
Universal SW Radio	49

CONVENTION CALENDAR

Date	Location	Club/Contact Person			
Sep 3-4	Alamogordo, NM	Alamogordo ARC/ Larry Moore 1830 Corte Del Ranchero, Alamogordo, NM 87107	Sep 24-25	Walla Walla, WA	Walla Walla Vly ARC/ Paul Hamon KA7UHL 1412 Walla Walla, Walla Walla, WA 99362
Sep 3-4	Shelby, NC	Shelby ARC/ Dale Mauney WA4BBN 1158 E. Marion St., Shelby, NC 28150	Sep 25	Berea, OH	Cleveland Hamfest Assoc/ Glenn Williams AF8C 513 Kenitworth Rd, Bay Village, OH 44140
Sep 9-10	Portland, OR	ARRL National Conv/ Al Berg WB7SIC 2256 SE Oak Crest, Hillsboro, OR 97123	Sep 25	Adrian, MI	Adrian ARC/ Mark Hinkleman NU8Z 108 E. Kilbuck, Tecumseh, MI 49286
Sep 10	Windsor, ME	Augusta Emergency ARU/ Arnold Smith KA1KPW RR #1 Box 475, Augusta, ME 04330	Sep 25	Gainesville, GA	Lanierland ARC/ Eddie Keith KK4IG 3137 Lake Ranch Circle, Gainesville, GA 30506
Sep 10	Ballston, NY	Saratoga Co RACES/ David Atwell N2FEP Rd 5 Box D-15, Ballston Spa, NY 12020	Sep 25	Willimantic, CT	Natchaug ARA/ Ken Carvell KC1EW P.O. Box 19, Coventry, CT 06238
Sep 10	Niagara Falls, NY	ARA/ Robert Cade WA7VKF 2681 Staley Rd, Grand Island, NY 14072	Oct 1	Huntington, WV	Tri-State ARA/ Jim Baker KBKVV P.O. Box 19, Coventry, CT 06238
Sep 10-11	Louisville, KY	Gtr Louisville ARC/ Patsy Karr KA4ISJ Rt 5 Forest Hill Rd, Shepherdsville, KY 40165	Oct 1-2	Boxboro, MA	New England Div/ Eugene Hastings W1VRK 18 Churchill Rd, Marblehead, MA 01945
Sep 10-11	Melbourne, FL	Pialnum Coast ARS/ George Livingston 720 Van Buren Dr., Melbourne, FL 32935	Oct 1-2	Biloxi, MS	Miss.State Convention/ Wayne Spearman K4JHE 133 Baywood Dr, Biloxi, MS 39532
Sep 10-11	Mobile, AL	Mobile ARC/ Murray Flanders K4RQQ 9075 Howells Ferry Rd., Semmes, AL 36575	Oct 2	Rockford, IL	Ill.State Convention/ James Miller W4JR 5581 Elnor Ave, Rockford, IL 61108
Sep 11	Findlay, OH	Findlay RC/ Mark Rice N8GVF 521 Park St., Findlay, OH 45840	Oct 2	Yonkers, IL	Yonkers ARC/ John Costa WB2AUL 195 Woodlands Ave, Yonkers, NY 10703
Sep 11	Harrisburg, IL	Shawnee ARA/ Mike Hoshiko W9CJW 707 S. James St, Carbondale, IL 62901	Oct 2	W. Liberty, IA	Muscatine & IA City ARC/ Thomas Krmer KE0Y 905 Leroy, Muscatine, IA 52761
Sep 11	Marshall, MO	Indian Foothills ARC/ Randy Ebers KE0MV 125 Lakeview, Marshall, MO 65340	Oct 2	Springfield, OH	Springfield IRA/ Stephen Klipfel KA8QCS 825 S. Tecumseh Rd, Springfield, OH 45506
Sep 11	Gaithersburg, MD	Fdn for Am.Radio/ Robert Moore N3CKD 9449 Mayflower Ct, Laurel, MD 20707	Oct 2	Ellicott City, MD	Columbia ARA/ Art Goodman WA3CVG 5071 Beatrice Way, Columbia, MD 21044
Sep 11	Monett, MO	Ozarks ARC/ Carl Adcock WB0RSZ Rt 1 Box 247, Aurora, MO 65605	Oct 7-8	Warner Rbns, GA	Central GA ARC/ Jesse Kirkham WB4KQA 110 Brown Dr, Warner Robins, GA 31093
Sep 11	Butler, PA	Butler Co. ARA/ John Varljen K3HJH 174 Oak Hills Hts, Butler, PA 16001	Oct 8-9	Falls Ch., VA	DXPO 88/ John Kanode N4MM RFD 1 Box 73-A, Boyce, VA 22620
Sep 11	Joliet, IL	Bowling Brook ARC/ Ed Weinstein WD9AYR 7511 Walnut Ave, Woodbridge, IL 60432	Oct 8-9	Memphis, TN	Delta Div Conv/ James Alexander 2969 Iroquois, Memphis, TN 38111
Sep 17	Wichita Falls, TX	Wichita Falls ARS/ Steve Guerra WB5LCN 218 Indiana Ave, Wichita Falls, TX 76301	Oct 9	Queens, NY	Hall of Sci ARC/ Stephen Greenbaum 85-10 34th Ave, Jackson Hts, New York, NY 11372
Sep 17-18	Peoria, IL	Peoria Area ARC/ Richard Waldmeyer KA9JPT 2015 Alhambra Ct, Pekin, IL 61554	Oct 14-16	Houston, TX	Talk-In144.300, splx223.600, 223.600&445.225 rpt S Texas Section Conv/ Alan Cross WA5UZZ 13918 Lillia Rd, Houston, TX 77037
Sep 17-18	Va Beach, VA	Talk-In 146.6/76 W9UVI or 146.52 simplex Roanoke Div Conv/ Art Thiemens AA4AT 2836 Greenwood Rd, Chesapeake, VA 23321	Oct 15	Syracuse, NY	RA of Gtr Syracuse/ Vivian Douglas Box 88, Liverpool, NY 13088
Sep 18	Old Westbury, NY	Long Is Mobile ARC/ Mark Nadel NK2T 22 Springtime Lane East, Levittown, NY 11756	Oct 15	Gray, TN	Tri-Cities ARC/ Wendell Messimer K4ZHK 512 W. Poplar St., Johnson City, TN 37604
Sep 18	Cincinnati, OH	Gtr Cinci ARA/ John Haungs WA8STX 10615 Thornview Dr, Cincinnati, OH 45241	Oct 15-16	W Palm Bch, FL	Palm Bch Rptr Assoc/ James Schoech WD4LHF 129 Dayton Rd, Lake Worth, FL 33467
Sep 18	Pennsauken, NJ	S.Jersey RA/ Walter Schmidt W2EA 709 E. Graisbury Ave, Haddonfield, NJ 08033	Oct 22-23	Augusta, GA	ARC of Augusta/ James Abercrombie, JR N4JA PO Box 5543, Augusta, GA 30906
Sep 18	Danbury, CT	Candlewood ARA/ Raymond James K1EDU 52 Obtuse Rd S., Brookfield, CT 06804	Oct 28-30	Kingston, OK	Oklahoma State/ Dave Cox NB5N 1812 S. Umbrella Ct, Broken Arrow, OK 74012
Sep 18	Mt Clements, MI	L'Anse Creuse ARC/ Ralph Wilcox KA8YOJ 39610 Chart, Mt Clements, MI 48045	Oct 29-30	Chattanooga, TN	Chattanooga ARC/ Lane Wyse N4OM 4813 Shorewood Dr, Chattanooga, TN 37416
Sep 24	Sprucepine, NC	Mayland ARC/ David McCarty KK4PW Rt 2 Box 73A, Greenmountain, NC 28740	Oct 30	Shelby, MI	Ulica-Shelby Emerg Com Assoc/ Harold Henry 53062 Tundra Dr, Rochester, MI 48064
Sep 24	Goshen, NY	Orange Co RC/ Barbara Christopher N2AWI Rd 1 Box 447, Wallkill, NY 12589			

Monitoring Times is happy to run announcements of radio events open to our readers. Send your announcement at least 60 days before the event to: Monitoring Times Convention Calendar, P.O. Box 98, Brassstown, NC 28902.

RADIO LIBRARY

Latest scanner and short-wave books, accessories product info & discount prices on select items. Send for FREE catalog:

Firecom Communications
Post Office Box 61-H
New York, NY 10011
Phone (212) 989-5773

Missed that call again?

Let's face it, the audio from your mobile rig, scanner or HT is the weak link in your communications system. Use your car cassette or portable cassette deck and Kasi*Comm™ to enhance your handi-talki, mobile or scanner audio. Just put Kasi*Comm™ into your deck and plug into your external speaker jack, no modifications required. Specifically designed for communications equipment. Full 30 day guarantee, money back if not satisfied. Send \$13.95 (ILL residents add 7%) plus \$2.00 S/H to:

PLI Micro
P.O. Box 688 Dept B
Skokie, IL 60076

HEAR ALL THERE IS TO HEAR

30 MHz - 1300 MHz
Frequency search
service

Send SASE to:

Bruce K. Heald
6886 Jefferson St.
North Branch, MI 48461

RADIO ASTRONOMY

THE RADIO OBSERVER, a monthly 24-page "how-to-do-it" amateur radio astronomy magazine. Annual subscription . . . \$24
We are also suppliers of technical books, components and modules for the radio astronomy discipline. For a sample magazine and a current brochure send \$2 to:

BOB'S ELECTRONIC SERVICE
7605 DELAND AVE.
FT. PIERCE, FL 34951
Phone: (407) 464-2118

Publishing Sensitive Frequencies

A continuing controversy

In the past -- as long-time readers will remember -- we judiciously refrained from publishing radio frequencies used by federal law enforcement agencies. There were several reasons, not the least of which was that we would not want to provide any advantage to criminal elements who would use such information for their nefarious purposes.

Additionally, the more we draw attention to the fact that agencies are being casually monitored, the more these agencies are likely to scramble their communications -- and the more likely that additional legislation could be enacted to outlaw further our hobby interests. The prolific dissemination of sensitive frequency lists only adds fuel to the fire of federal retribution.

What if the government decided that the information being published was sensitive enough to justify their investigation of publications and publishers or even to subpoena their subscriber lists? Sure, you could holler "selective enforcement" until you were blue in the face, but they would still have you in court. Could you afford to pay the price of vindication?

But times have changed

Frequency directories abound. Identifications of licensees heard on the air are readily deduced by listening lawfully to their transmissions. Agencies involved in sensitive communications are equipped with scramblers (but often choose not to use them because of clarity, reduced range or just plain apathy).

There are monitoring laws: First, you cannot divulge to anyone else what you heard, nor can you use the information for personal gain (1934 Communications Act, section 705). If it is encrypted, a mobile telephone or a broadcast studio remote link, you aren't even allowed to listen (Electronic Communications Privacy Act, 1986).

While ECPA '86 is admittedly rife with contradictions, errors of omission and is totally unenforceable, it does specifically allow the monitoring of federal, military and law enforcement communications. No distinction is made regarding sensitive or non-sensitive frequencies.

In 1982, Bob Cutts, Chief of the FCC's Spectrum Management Division, responded to

a letter from the Radio Communications Monitoring Association (RCMA), a club composed primarily of scanner enthusiasts, concerning publication of sensitive frequencies.

In his letter, Cutts asserted that the Justice Department would take action against anyone who willingly publishes classified information. At that time, only certain frequencies of specific agencies (like Justice and Treasury) were classified.

While it may appear obvious to you and me that information that has been in the public domain for decades can hardly be classified, in 1982, by Presidential proclamation, all the previously-unclassified files of the Interdepartment Radio Advisory Committee (IRAC), custodian of federal and military frequencies, were classified in total -- Commerce, Agriculture, NOAA and all the rest.

Does this mean that a simple listing like an FAA frequency is a violation of law? How about a CIA frequency?

We posed this question to a long-time spokesman at IRAC who reassured us that publication of such frequencies -- even lists of frequencies -- are of no concern to the government. It is the context in which they are used. Do the lists contain additional information that would be a threat to national security? If the answer is "no," publish to your heart's content.

In fact, as of this date, neither Tom Kneitel (editor of *Popular Communications* and author of the best selling *Top Secret Registry of U.S. Government Radio Frequencies*) nor I have ever been contacted by any agency concerning our publications.

Still, one lingering dilemma remains. What about publishing undercover frequencies used by field agents whose lives are on the line if their identities are discovered? This may not be a matter of law, but it is a matter of conscience. There is no easy answer to this one. It is a judgment call.

It shall be the general policy of *Monitoring Times* to publish all frequencies of interest to our readers, while exercising the obligation to avoid divulging any previously-unpublished listing which, by its disclosure, might endanger the life of a law enforcement agent.

Bob Grove
Publisher



THE CIA SUBSCRIBES.



SHOULDN'T YOU?

The CIA, in fact, has several subscriptions to **Monitoring Times**. That's because every month **Monitoring Times** offers the latest in:

- ▶ International Broadcasting
- ▶ Utility Monitoring
- ▶ Scanners
- ▶ Shortwave and Longwave
- ▶ Satellites
- ▶ Electronic Projects
- ▶ Listening Tips
- ▶ Frequency Lists
- ▶ Broadcasting Schedules
- ▶ News-breaking Articles
- ▶ Features
- ▶ Exclusive Interviews
- ▶ Insights from the Experts
- ▶ New Product Reviews & Tests

Jammed with up-to-date information and concisely written by the top writers in the field, **Monitoring Times** is considered indispensable reading by top government agencies.

From longwave to microwave, if *you* are interested in communications, **Monitoring Times** is your foremost guide to international broadcasters; new equipment and accessories; profiles of government, military, police and fire networks; home projects; and tips on monitoring everything from air-

to-ground and ship-to-shore to radioteletype, facsimile and space communications.

Order your subscription today before another issue goes by: only \$18 per year in the U.S.; \$26 per year for foreign and Canada. For a sample issue, send \$2 (foreign, send 5 IRCs).

MONITORING TIMES

P.O. Box 98
Brasstown, N.C. 28902

Your authoritative source, every month.

- ☐ Yes, begin my subscription to Monitoring Times. I've enclosed a check.
- ☐ Send me a sample issue. Enclosed is a check for \$2.
- ☐ For MC/VISA orders, call 704-837-9200.

Name

Street

City

State

Zip

WHEN YOU CAN'T AFFORD TO MISS A SINGLE WORD

When you demand uncompromised performance and dependability from your communications system, you need an ICOM. Featuring a full product line of rugged land mobile, marine, aircraft, and ham (amateur) transceivers and receivers, ICOM provides you with the most sophisticated and reliable communications available.

Spectacular performance, smooth operation and incomparable dependability are confirmation

of ICOM equipment's top-line quality. These superb characteristics are built into every ICOM handheld, mobile, base unit and accessory.

ICOM's full product line also includes the IC-R71A 0.1 to 100MHz and IC-R7000 25 to 1000MHz/1025 to 2000MHz receivers. They assure your maximum operating performance anywhere, anytime. Move into the winner's circle with ICOM and enjoy a commitment to excellence!



ICOM
First in Communications

ICOM America, Inc., 2380-116th Ave. N.E., Bellevue, WA 98004 Customer Service Hotline (206) 454-7619
3150 Premier Drive, Suite 126, Irving, TX 75063 / 1777 Phoenix Parkway, Suite 201, Atlanta, GA 30349
ICOM CANADA, A Division of ICOM America, Inc., 3071 - #5 Road, Unit 9, Richmond, B.C. V6X 2T4 Canada

All stated specifications are subject to change without notice or obligation. All ICOM radios significantly exceed FCC regulations limiting spurious emissions. Signal788.